PAINT and VARNISH

THE TECHNICAL MAGAZINE FOR MANUFACTURERS OF PAINT, VARNISH, LACQUER AND OTHER SYNTHETIC FINISHES

MAY
1959

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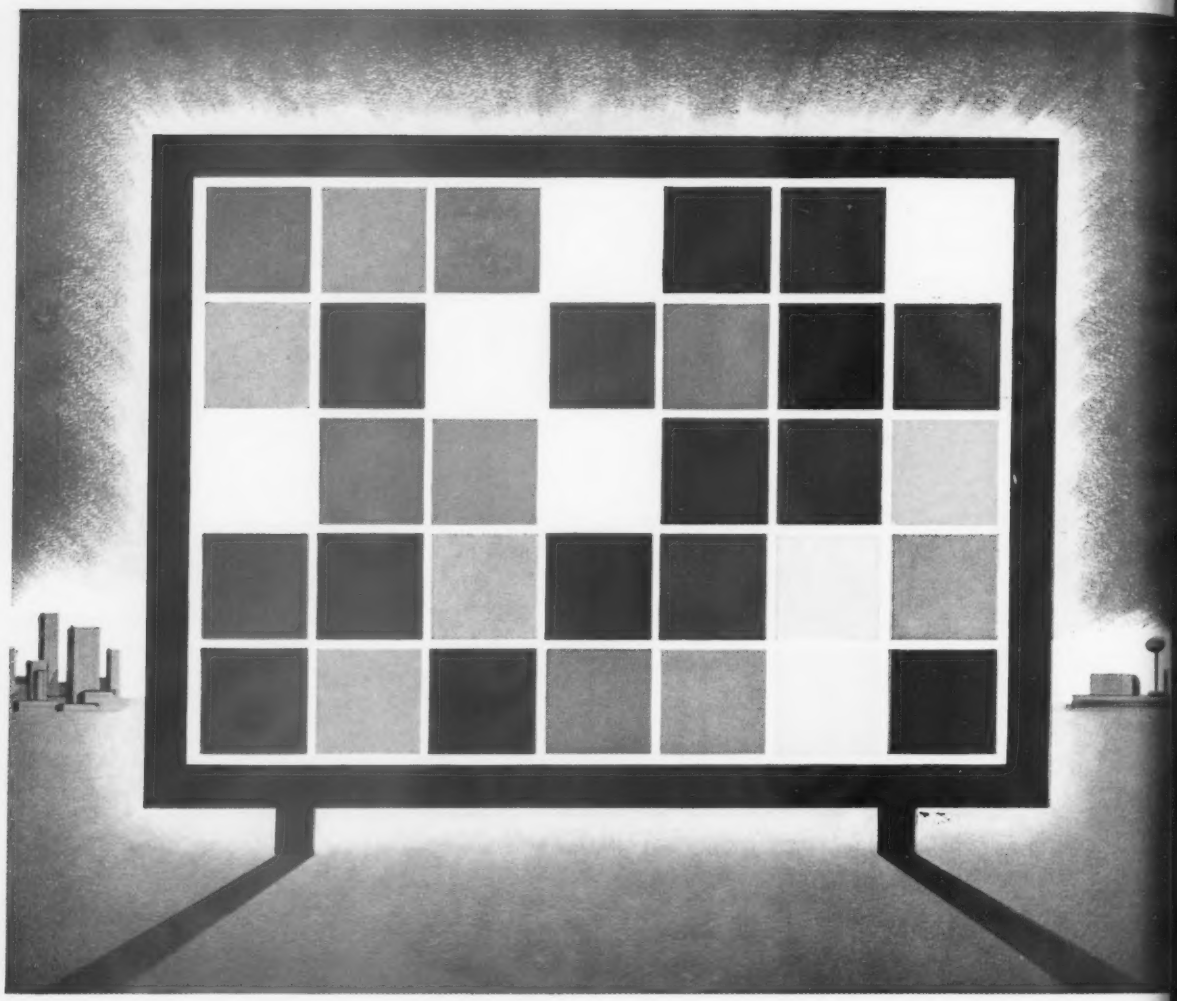

How Shell Chemical serves the surface coating industry

Shell Chemical has maintained for many years an active program of practical and theoretical research in oxygenated solvents and Epon® resins for surface coatings.

The result has been a better understanding of the effect of solvents on film formers—leading to superior performance and greater economy in surface coating formulations.

Epon resins are still another important outgrowth of Shell research. Surface coatings based on Epon resins are among the hardest, toughest, and most resistant to the attack of chemicals and corrosion ever developed.

Shell Chemical's Technical Service Laboratory offers you assistance in solving surface coating formulation problems. Write or phone your nearest Shell Chemical district office if we can be of assistance.

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SHELL

MEMO TO PVP READERS:

In Britain, polyester lacquers are making their bid to replace cellulosic types for furniture finishes. This development was highlighted at the Furniture Exhibition in London where kitchen furniture finished with pigmented polyester lacquer was displayed. However, cost and the need of specialized application equipment have slowed up the adoption of this particular finish by the furniture industry. The public likes the very high gloss finish that polyesters can impart to furniture, and there is some speculation that sooner or later cellulosic lacquers will be replaced by these new polyester finishes. To get an insight of this development and other trends in the coatings field, we direct your attention to our exclusive feature on British Paint Development, page 89.

* * *

The presence of water in emulsion paints has limited their use on metal surfaces. Next month our lead feature will deal with an interesting study on the use of certain additives and pigments in PVAc emulsion primers and their effect in preventing corrosion. Complete formulation and test results will be presented.

* * *

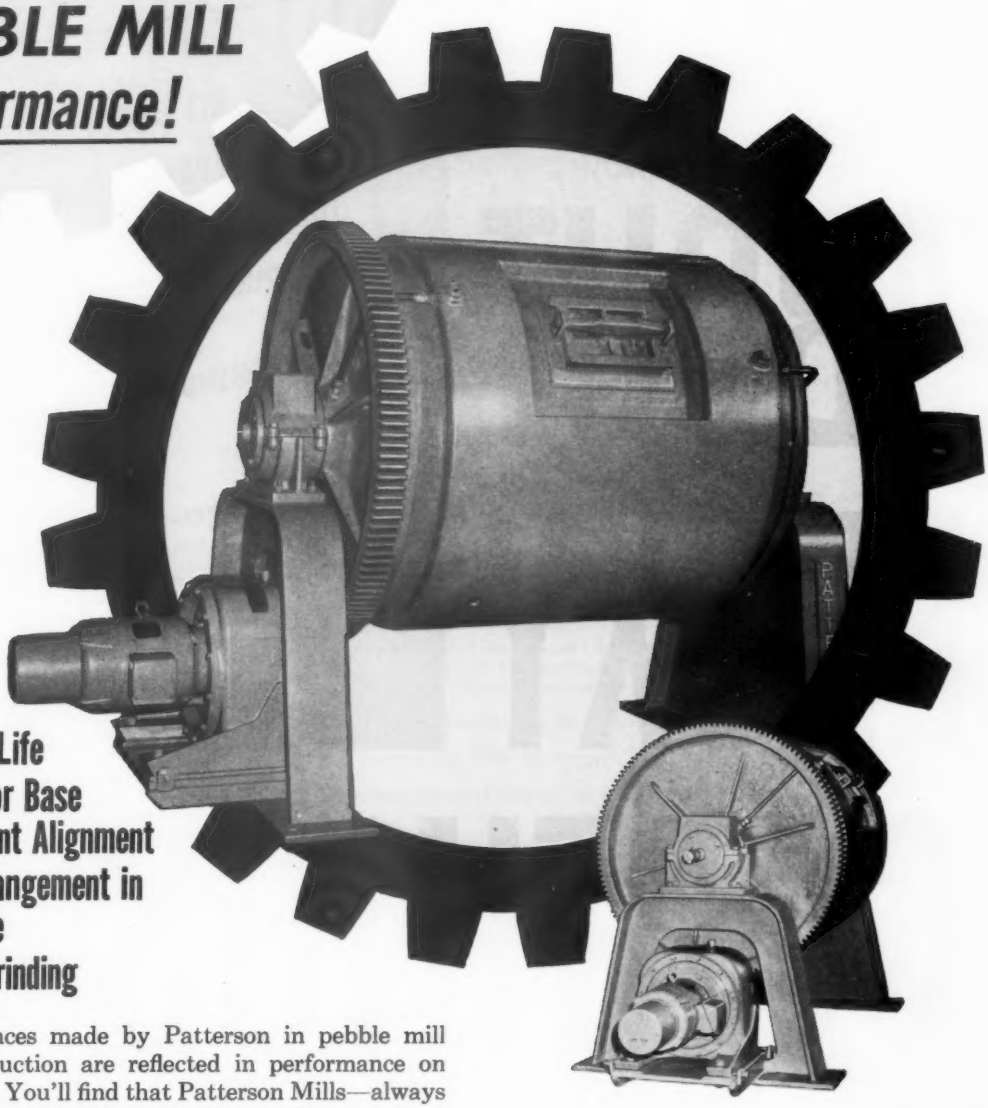
An inexpensive way to cut down noise can now be achieved through paint. This new paint is described as an alkyd-latex type containing specially prepared sound-controlling granules. When applied to walls and ceilings, this paint is claimed to dampen the "bounce-back" of sound waves and, in addition, traps the sound waves within the miniscule peaks and valleys of the paint surface. A field evaluation showed that the use of this special paint caused a drop of some 13% in noise level compared to a conventional flat paint. Now, noise can be merely painted away!

Cordially,

Tony Errico

Anthony Errico
EDITOR

progress with *Patterson* in PEBBLE MILL performance!



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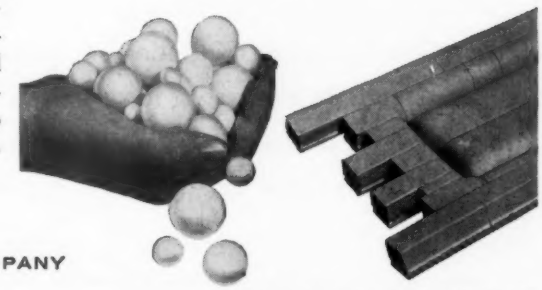

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Every formulator should know

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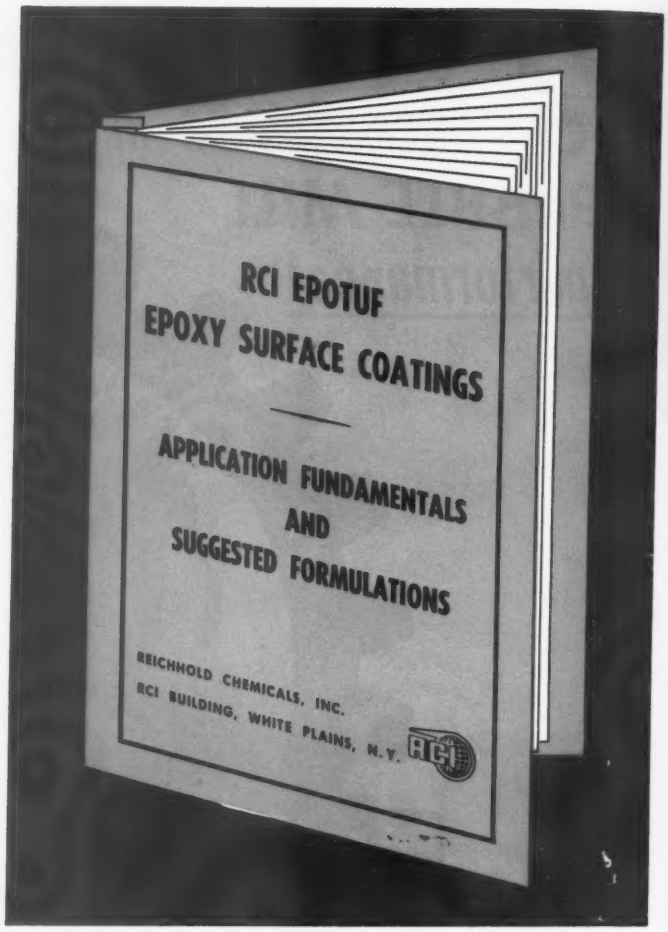

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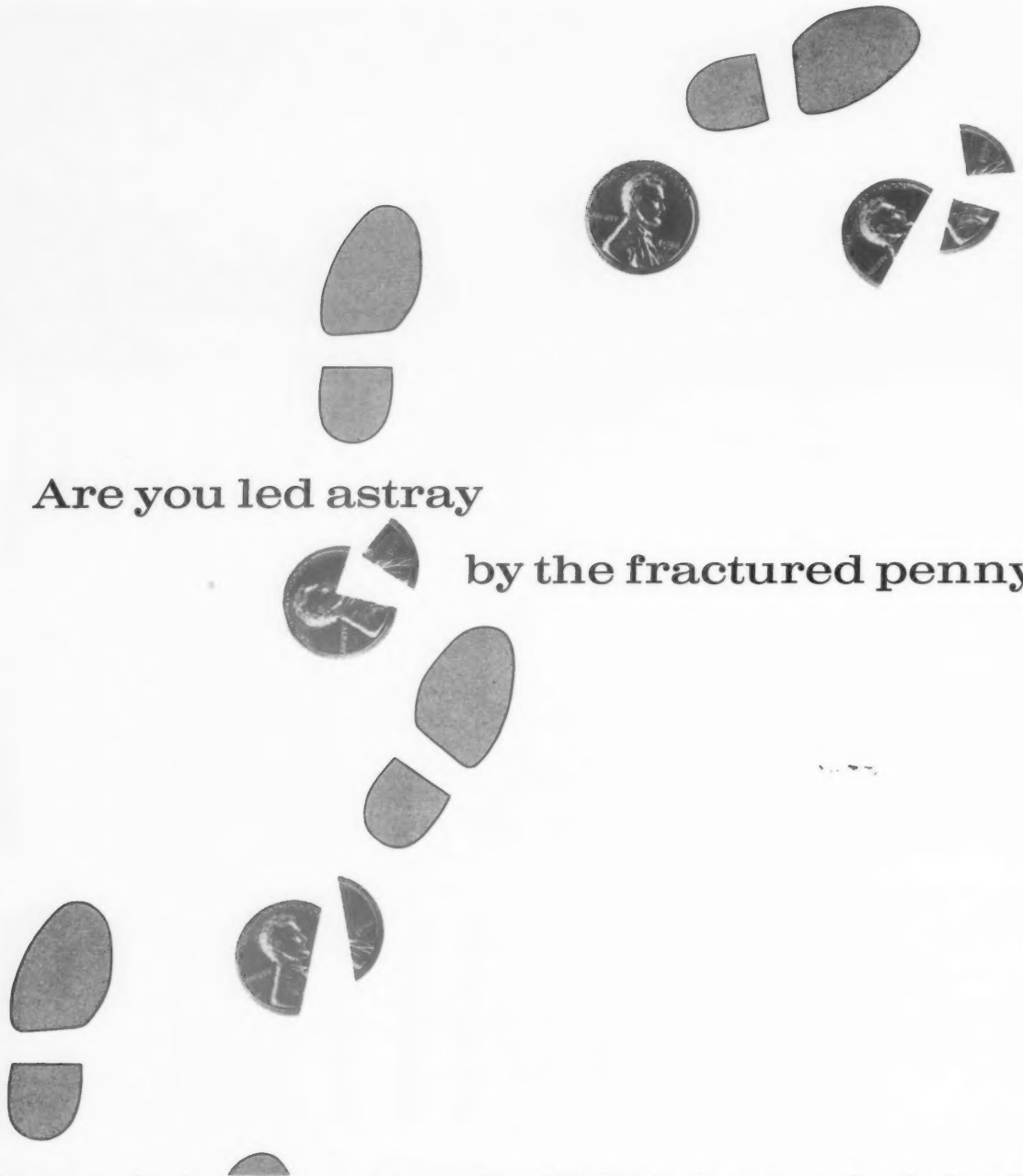

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EDITORIAL COMMENT

Lagging Sales

ALTHOUGH automobile manufacturers are confidently predicting that sales for 1959 will reach a volume of 5½ million cars, there are some doubts that this volume will be attained. Factors which are contributing to the current lag in automobile sales are: unemployment, which has slowed down credit sales, the impact of the foreign small cars, consumer resistance against high prices, and the hesitancy of potential buyers who are awaiting the introduction of the American-made small car next fall. Thus, current estimates are that automobiles sales will be around 5 million for 1959, providing there is no prolonged steel strike.

Another "Cure-All"

THE City of New York is currently testing a plastic street guideline as a substitute for traffic paint. These plastic lines are reported to be cheaper and easier to see, and more permanent than traffic paint.

According to Hulan E. Jack, Manhattan Borough President, heavy traffic causes paint to quickly wear off. With no guide line, motorists fail to keep in line, especially during peak periods, resulting in sideswipe mishaps caused by weaving and traffic jams. Also, without visible lines, it was found that in the case of high-speed roadways, motorists tend to straddle lanes and reduce the car space by one-third.

One feature which the plastic line has over paint, New York City points out, is cost. The plastic lines would run about 15 cents per foot compared to 48 cents per foot for paint over a three year period. Furthermore, the plastic lines have been guaranteed to last for three years. If failure does occur before three years, the plastic line and cost of installation will be paid by the manufacturer.

While it may be a bit too early to assess the impact that this development will have on the use of traffic paints in our cities and towns, yet it is another one of those substitutes that bears watching as a "cure-all" material for traffic markings.

Ultrasonic Paint Stripping

AT the recent I. R. E. Show (Institute of Radio Engineers), the first working model of the ultrasonic dishwasher was displayed. By using high frequency sound waves at 40,000 cycles per second the washing and drying cycle of 25-30 minutes for conventional dishwashers was reduced to one-half the time, and most important, stubbornly clinging food particles which had to be cleaned off by hand were easily removed.

The ability of ultrasonic agitation to remove food and foreign particles is due to the high frequency waves which alternately compress and decompress the water in the sink. This action causes the formation of tiny vacuum bubbles to form and collapse with tremendous force—a force which literally "blasts off" all contaminants from items being washed.

The aircraft and electronic manufacturers have been the major spur behind the growth of ultrasonics. Before the development of ultrasonic cleaners, jet-engine nozzles and oil filters had to be thrown away when dirty. Now embedded residue can be removed in a matter of minutes through the use of sound energy.

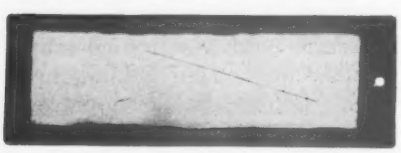
From the above applications, it is apparent that ultrasonic energy has possibilities in paint removing operations. Removal of paint on a large scale is not envisioned in the immediate future with this method, but for small rejected parts, ultrasonic energy can appreciably hasten the operation where conventional strippers are employed.

B-1030

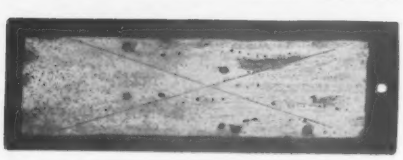
B-1030

a new and superior wash primer by Shawinigan

B-1030 is a new formulation for a two package wash primer based on BUTVAR, Shawinigan Resins' polyvinyl butyral resin. Developed especially to provide high early water resistance, B-1030 is also superior in adhesion to a variety of topcoats and substrates.



B-1030



WP-1.

B-1030 has demonstrated superior corrosion resistance. The steel panel shown at top was coated with B-1030, the other with WP-1. Each was exposed without topcoats to 5% salt fog for 500 hours. When the wash primer films were removed the panel protected by B-1030 showed much less pitting.

Other advantages of B-1030 are no hard pigment settling and lower cost per square foot when applied than WP-1. Write Shawinigan Resins Corporation, Dept. 2205 Springfield 1, Mass., for working formulations and technical data on BUTVAR and B-1030.

SALES OFFICES: ATLANTA CHICAGO LOS ANGELES NEW YORK SAN FRANCISCO SPRINGFIELD

BUTVAR® *polyvinyl butyral resins by*

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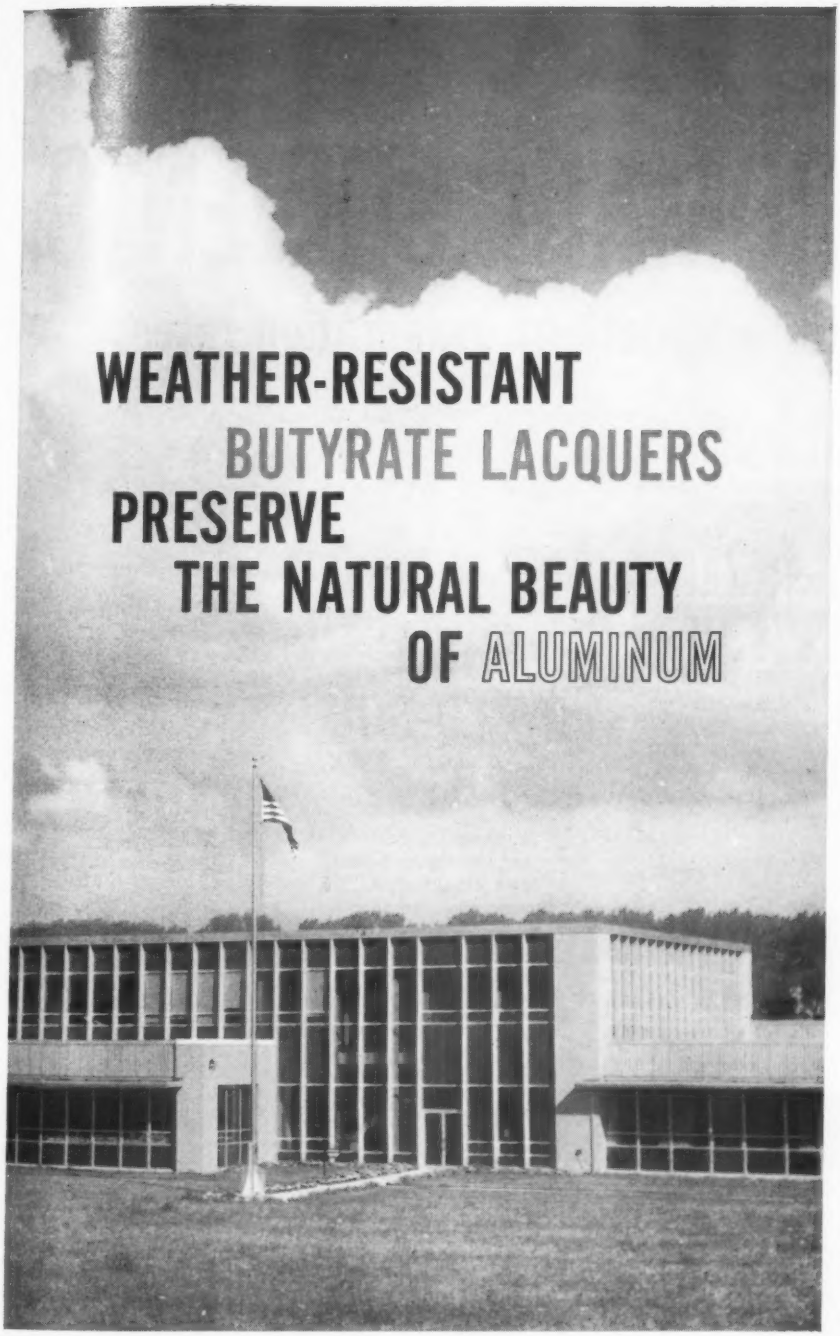

Butyrate lacquers provide clear, weather-resistant coatings that won't yellow, even under prolonged exposure to sunlight. They have high strength and flexibility ...withstand oxidation and discoloring...and are little affected by salt spray or rapid temperature changes.

When outdoor aluminum surfaces are protected with Butyrate lacquers, cleaning and maintenance costs are at a minimum. Usually, the action of rain itself is enough to keep aluminum surfaces clean.

This combination of features makes Butyrate lacquers particularly advantageous for use on aluminum curtain walls, siding, spandrels, louvers, solar canopies and architectural trim and hardware.

The growing use of aluminum outdoors is building a demand for durable, weather-resistant protective coatings. You can take advantage of this opportunity for new business by offering lacquers made from Eastman Half-Second Butyrate.

An informative 15-minute, 16mm. sound color film has been produced especially for viewing by those interested in this market. Would you like to see it? See below.

The aluminum exterior of the American Sterilizer Company plant at Erie, Pennsylvania, is protected against weather and oxidation with a clear, colorless Butyrate lacquer.

The finest lacquers for aluminum are made with

HALF SECOND BUTYRATE

an Eastman film former

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LACQUER FORMULATORS!

Here's how you can get the complete story on this new type of protective coating for outdoor aluminum.

1) Send for Eastman's catalog on Butyrate lacquer. It tells you where this new lacquer is proving particularly successful and why it is so effective in preserving aluminum surfaces.

2) Send for 16mm. sound color film. Please list the date you plan to show the film and an alternate date.

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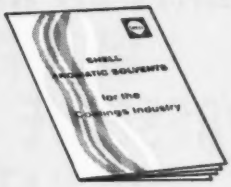
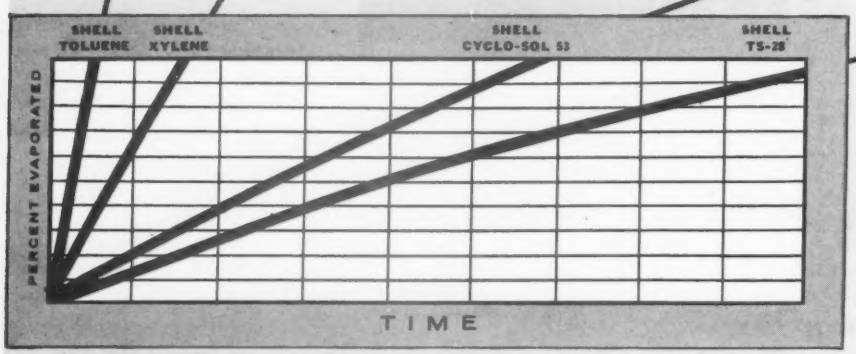


Typical properties are given in the booklet shown. Write for a copy.

SHELL TS-28 SOLVENT

. . . a still slower drying aromatic concentrate of medium high solvency. Recommended for baking finishes and flow coating.



These Shell solvents cover a very wide range of evaporation rates. Their individual characteristics satisfy specific requirements in a great variety of formulations.

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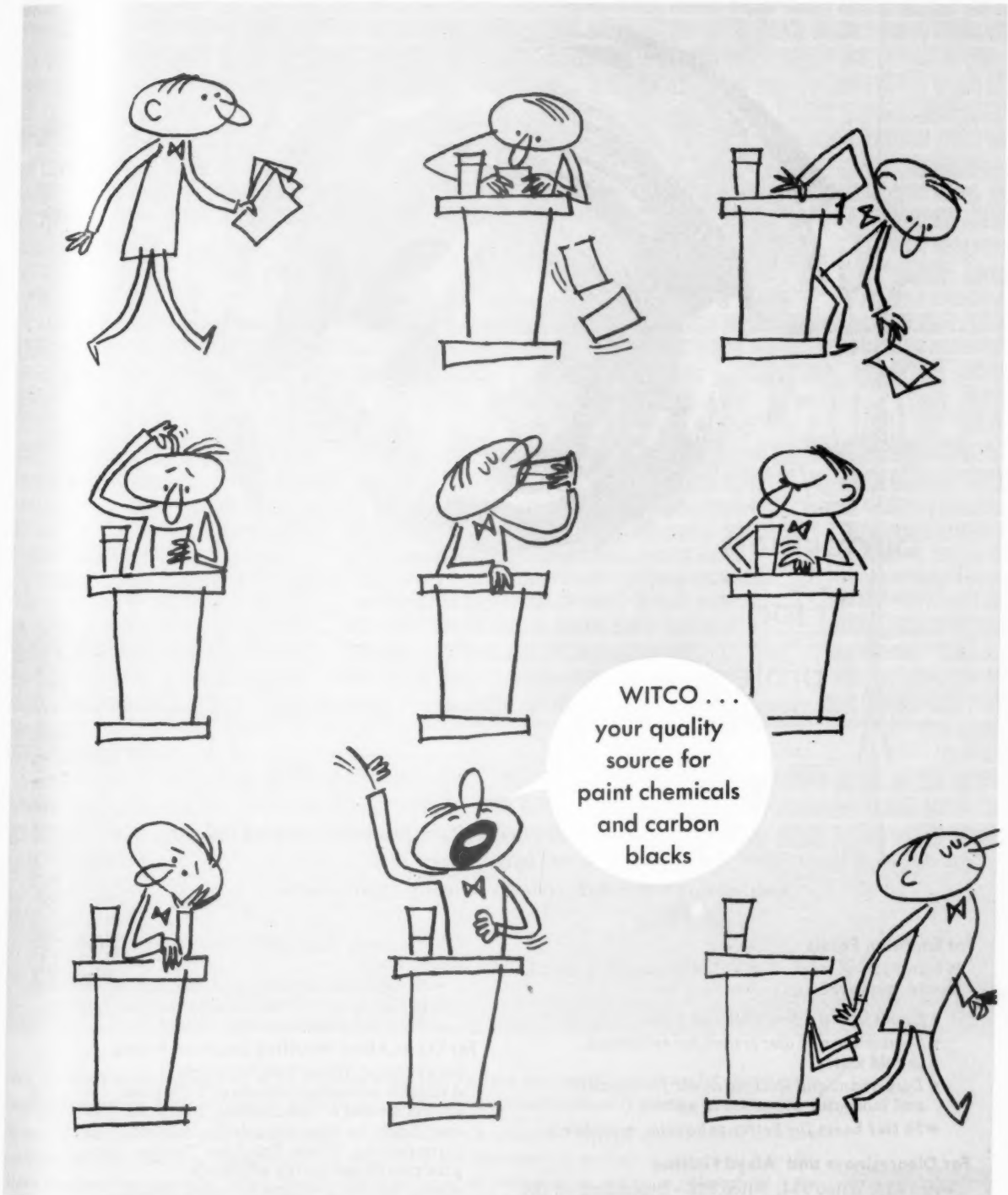

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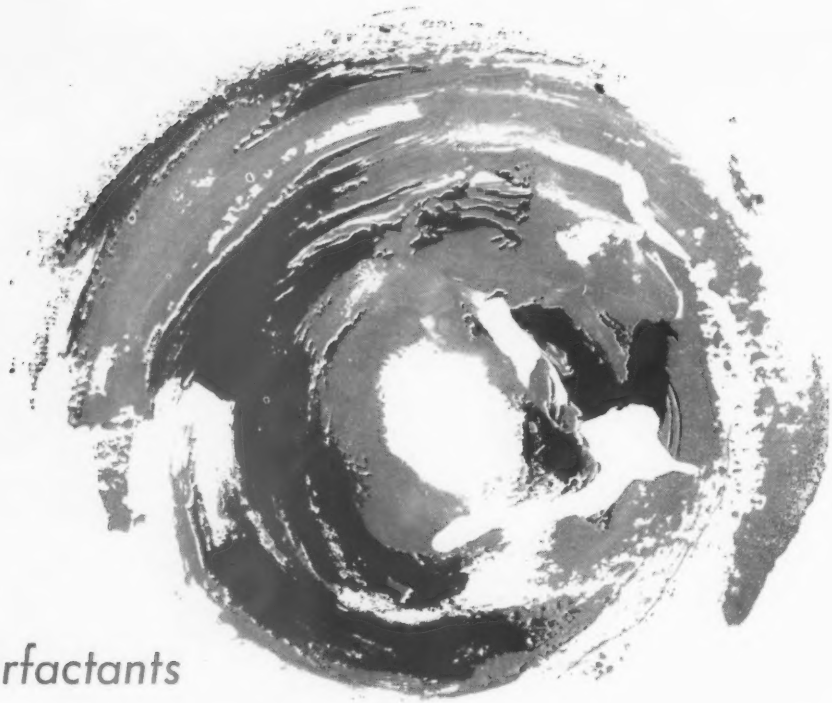

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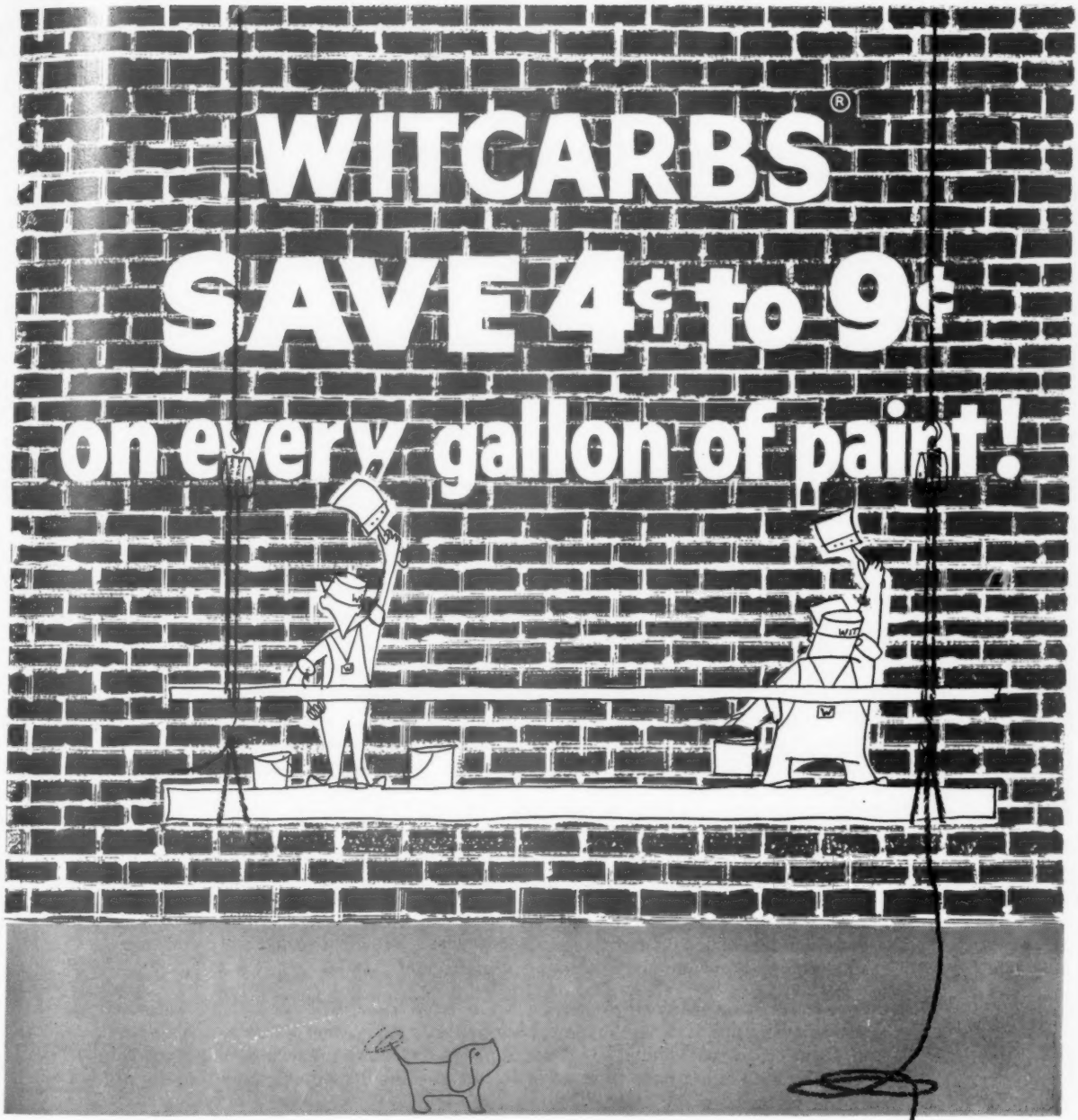

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Write today for Technical Bulletin W-4. It describes the four types of Witcarbs that are available and has typical formulations for enamel and alkyd paints. Witco Chemical Company, Inc., Dept. PV-5 **122 East 42nd Street, New York 17, N. Y.**

Witco Chemicals for the paint industry include: Stearates • Driers • Extenders • Emulsifiers • Surface Active Agents • Plasticizers • Flatting Agents • Antifouling Agents • Viscosity Modifiers • Phthalic Anhydride • Carbon Blacks—***Remember Witco . . . A Growing Source of Chemicals for Industry***

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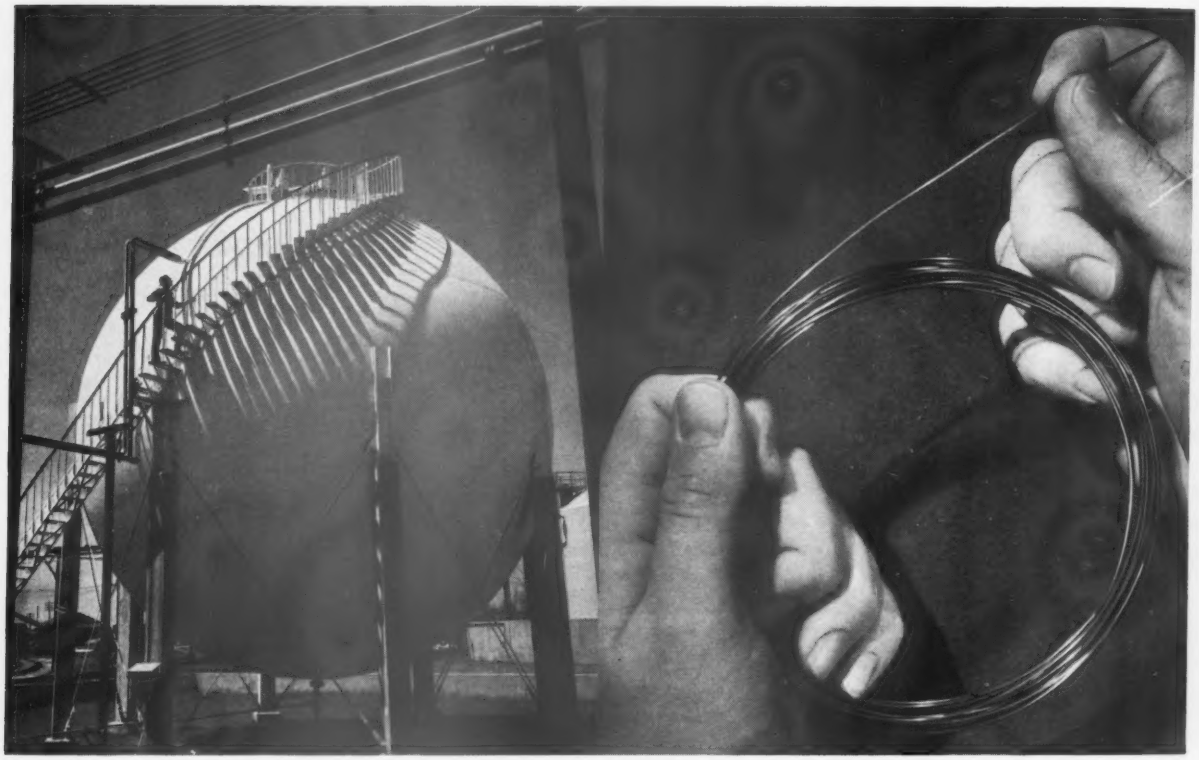


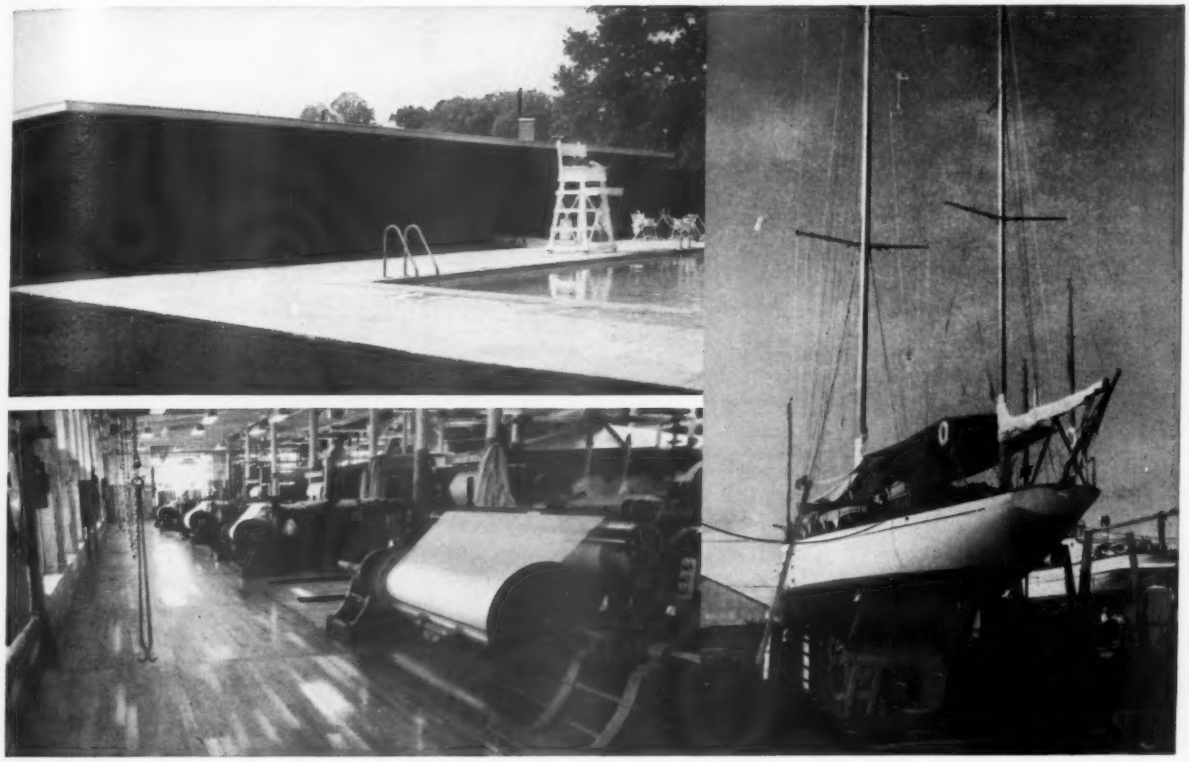
1. **Two-component system.** HYLENE isocyanate-polyol reaction product and polyhydroxy resin are *mixed prior to application.* These urethane finishes can be either clear or pigmented. They cure rapidly at room temperature and offer good film build. Potential uses include maintenance coatings with excellent weatherability and overall resistance to a wide range of deteriorating factors.

2. **One-component system requiring a heat cure.** In this system HYLENE isocyanate groups have been made nonreactive until application of 300° F. heat. These urethane coatings are finding industrial applications as wire enameling. Wire insulated with this kind of urethane finish can be soldered without stripping away the enamel.

3. **One-component system** containing a HYLENE isocyanate-terminated polymer *cured by atmospheric moisture* and not dependent upon oxygen. Such urethane finishes can be applied by all conventional methods. They have high gloss retention and weatherability. Suggested uses include clear interior or exterior finishes on wood, metal, leather and concrete. This type of urethane finish, in many uses, is superior to top-grade spar varnish.

4. **One-component system** created by reacting HYLENE isocyanate with a *drying oil.* High gloss, resistance to abrasion, moisture, solvents, chemicals, dirt and aging are characteristic of these urethane finishes. They can be compounded at a relatively low cost.

4 urethane coating systems



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Our technical representative will be glad to help you investigate the manufacture of urethane finishes unique to your company. Or, if you prefer, we will send you technical literature covering HYLENE and urethane chemistry. Write to: E. I. du Pont de Nemours & Co. (Inc.), Elastomer Chemicals Department PVJ-5, Wilmington 98, Delaware.

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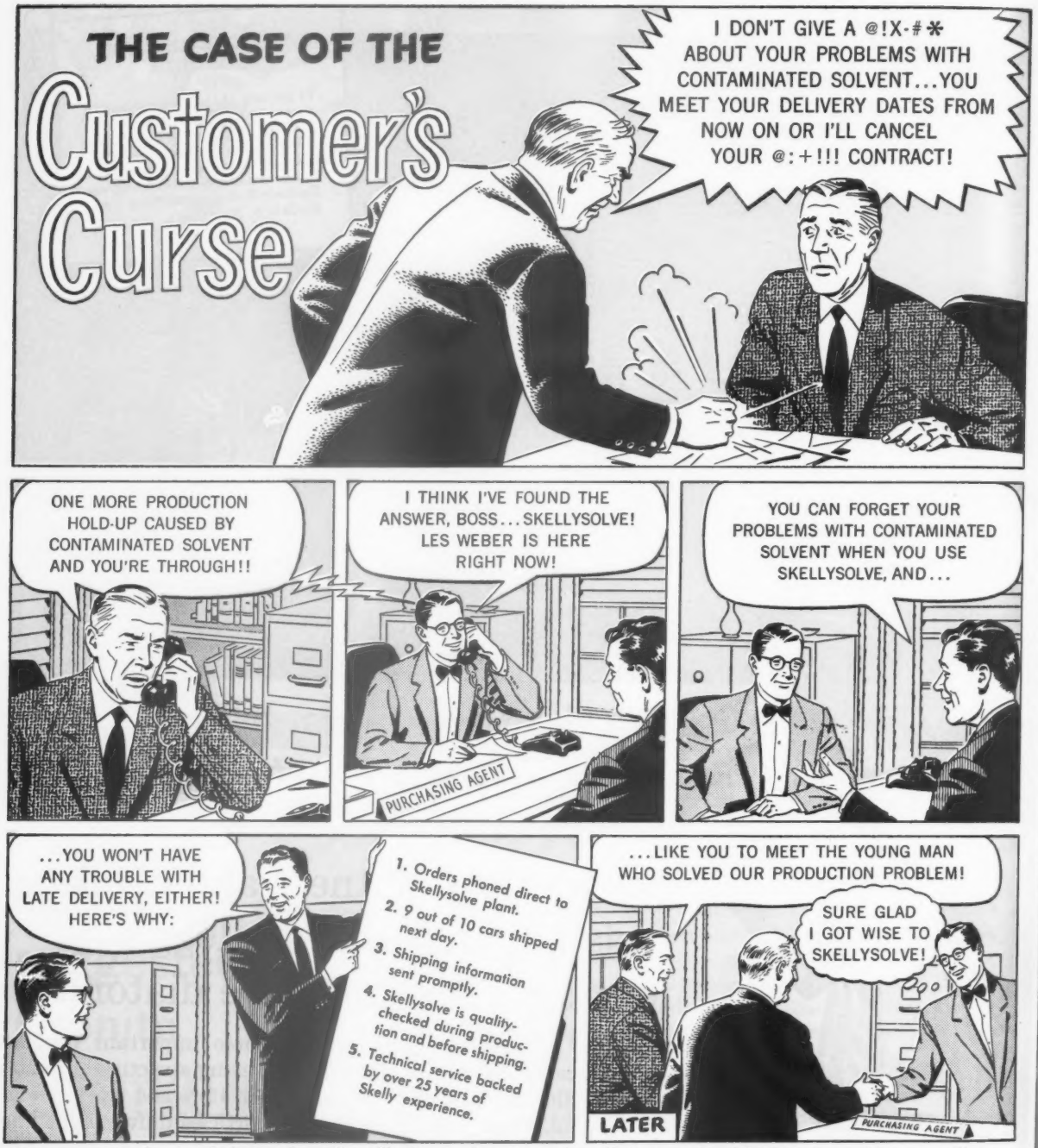
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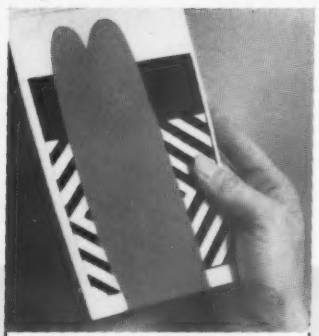

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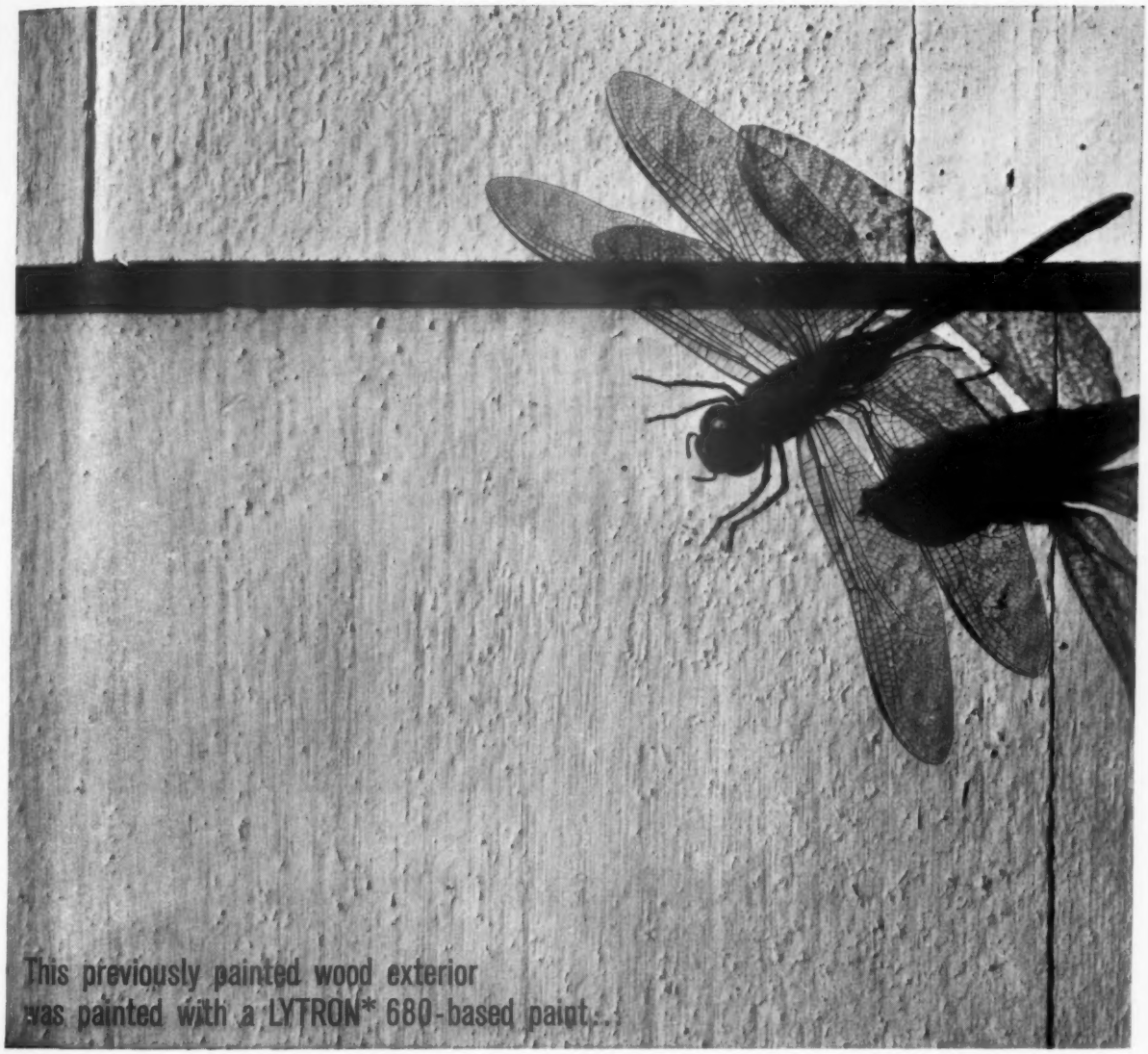
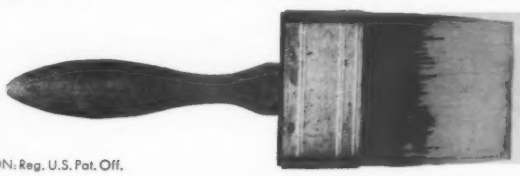


39 MONTHS AGO

Commercial exterior paints based on Lytron 680 are taking over a bigger share of a brand new market. The close-up above shows you why. Latex does a beautiful *lasting* job on wood—previously painted or primed. All through the country in the most severe climates, and on all types of wood. Bring yourself up-to-date on Lytron 680. See how quickly paints based on this unique acrylic-type polymer dry, how smooth a film they produce even below 40°F. There's no color mottling, no spotting. Controlled small particle size assures binding of high pigment volume, excellent adhesion, superior color retention, greater stability. Clean-up is with soap and water. Note: you can blend Lytron 680 with styrene-butadiene or alkyd emulsion systems to gain its superior properties at low cost. Get your share of a booming new market—write for evaluation sample and complete technical data on Lytron 680 today. Monsanto Chemical Company, Plastics Division, Surface Coating Resins Department, Springfield 2, Massachusetts.



Other Monsanto products for the surface coating industry include Amino Resins, Phenolic Resins, and Styrene Latices and Resins.

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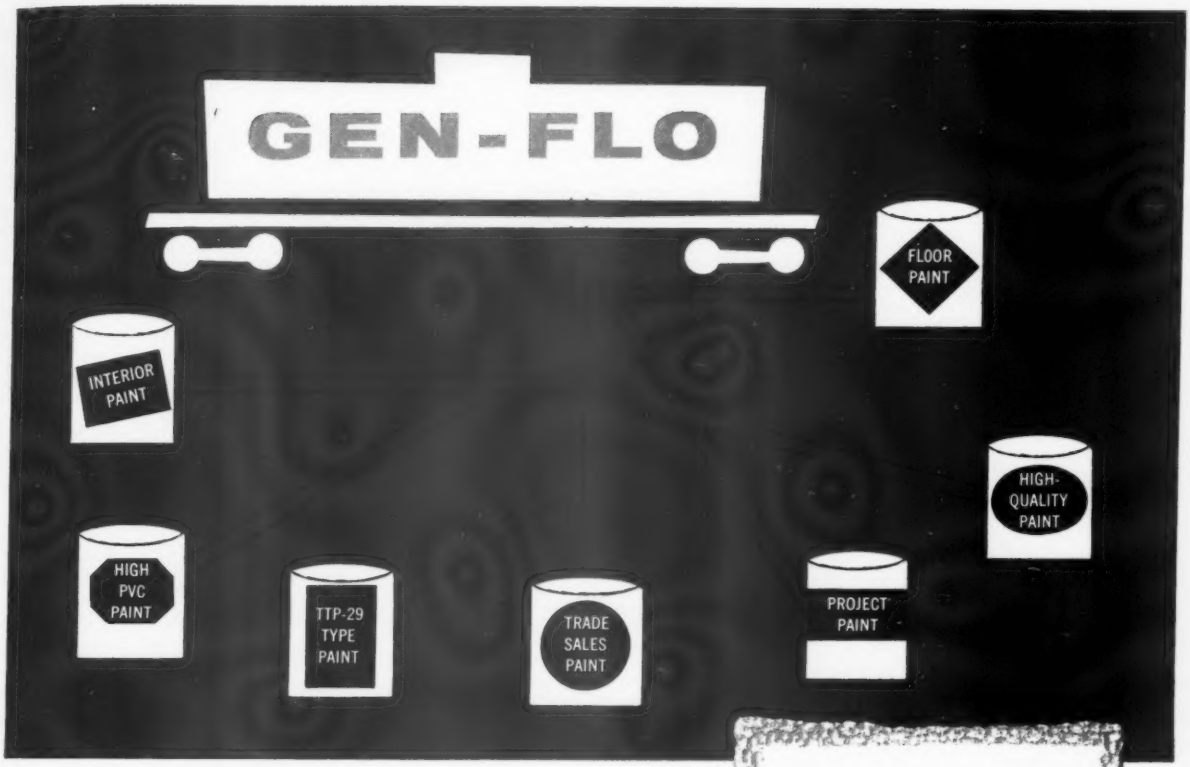

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CHEMICAL DIVISION
AKRON, OHIO

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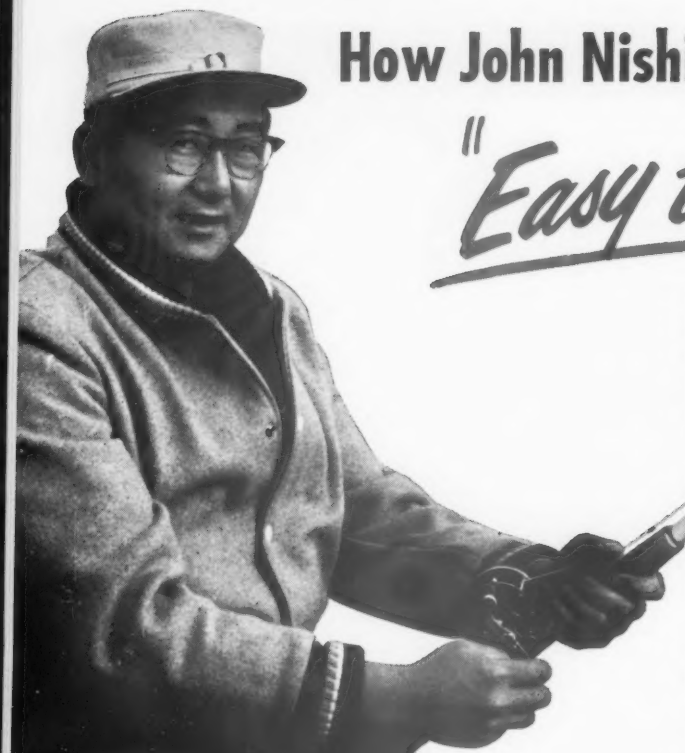
Chemical Division GENERAL THE GENERAL TIRE & RUBBER CO. GEN-FLO®

How John Nishiyama Makes ADM "Easy to Buy from"

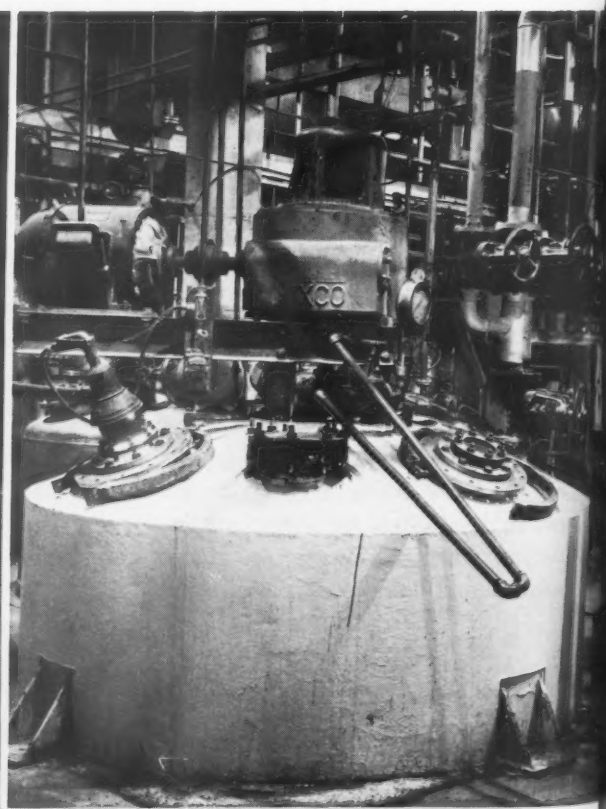


Weekends when the albacore are running, John Nishiyama likes to try his luck angling the deep, blue waters off Catalina Island. It's a great sport, and a perfect change of pace for the busy superintendent of ADM's Los Angeles resin plant.

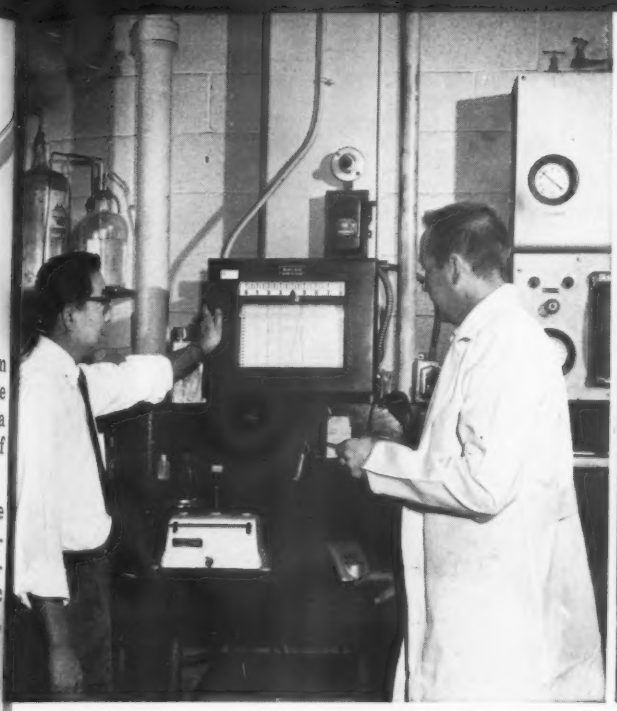
On his job, luck is strictly taboo. Producing the complete line of ADM resins to meet rigid specifications is a big responsibility . . . requires pin-point precision, clock-work timing. Even with the latest electronic control equipment, it calls for all the skill, training, and concentration a man can muster.

John is tall in these traits, as are all the men in ADM's six resin plants. Aside from deep sea fishing since age seven, his background includes college, two years soldiering during World War II, and six years' quality control work before transferring to production in 1955. He's well qualified to tell about ADM production . . .

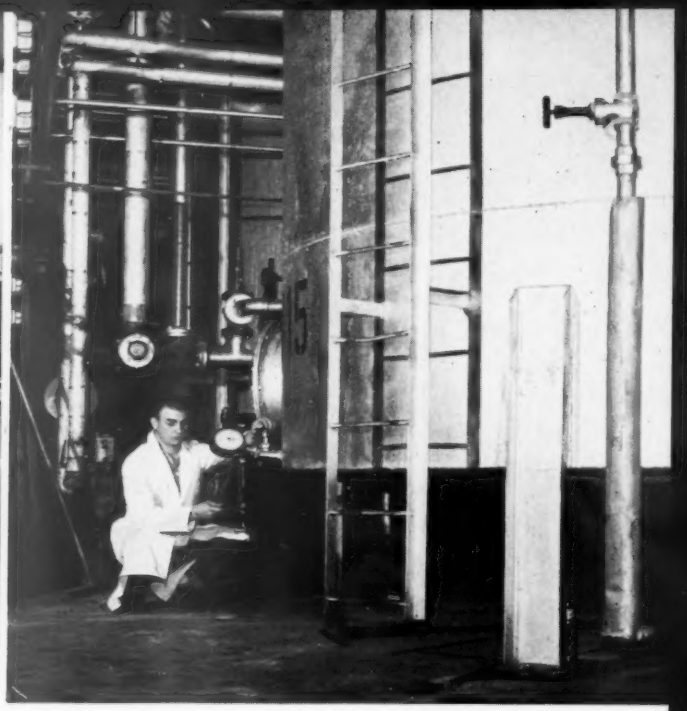
ADM RESINEWS



❸ "With an okay from the control lab, a perfect balance of ingredients—so critical to the finished product—is achieved by carefully metering or weighing raw materials into the electronically controlled reactors. We are equipped to make resins, polyesters, copolymers and polymers. As each batch is processed, filtered, adjusted to specs, and finally pumped into kitchen-clean containers, testing is continuous to maintain full control over quality.



"Our particular magic is Full Control. Constant plotting of data obtained from electronic instruments and from frequent 'kettle' test samples give us a true running picture of what's happening . . . absolute control during the entire production cycle.



❷ "Full Control starts with raw materials. Before we pump a drop in or out of these bulk tanks, control chemists make certain it meets our rigid specifications. Control is our conscience, and a tough one, too! Incidentally, these bulk tanks enable ADM to buy premium grade raw material in volume . . . thus insuring extra quality products.

❹ "The network formed by ADM's production points is so unique, as shown here by Harold E. Mork, Los Angeles plant manager. With resin plants at Newark, Pensacola, St. Louis, Minneapolis, Los Angeles, and Toronto, we give the fastest, most economical service in the industry. Large warehouse and bulk tank storage insures dependable delivery . . . reduces the chance your supply will ever be cut off."

❺ *John gets a welcome lift home from wife, Elaine after a long day . . . but the lights of ADM's plants across the nation will burn through the night.*

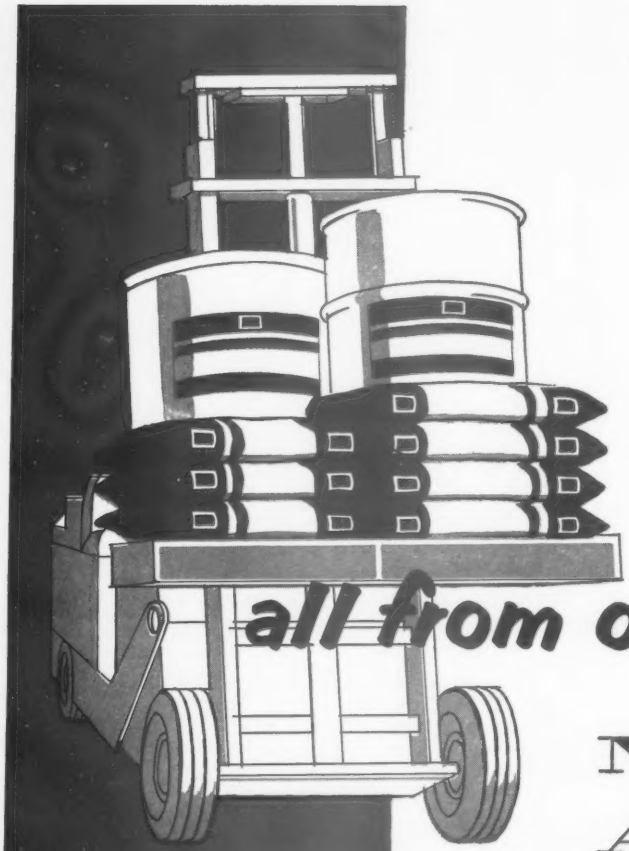
ADM's team of specialists is organized and equipped to make the best products possible. Research creates new and better products . . . control labs at all plants assure quality and uniformity . . . technical representatives provide top sales and technical service.

Basic to the team are the well-trained men in ADM's strategically located plants who use the finest equipment and processing methods to produce outstanding products . . . men like John Nishiyama, one of 4,903 employees who make ADM *easy to buy from.*

Archer-Daniels-Midland

RESIN and PLASTICS DIVISION

729 INVESTORS BLDG. MINNEAPOLIS, MINN.



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Whatever combination of resin chemicals you use, National Aniline can supply top quality from nearby modern plants which are integrated right back to basic raw materials within the Allied Chemical group.

So for quality, service and low delivered-cost, it pays to order from National Aniline.

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LATEST DEVELOPMENTS in DISPERSION EQUIPMENT

Ball and Pebble Mills. 29

Roller Mills. 33

Morehouse Mill and Cowles Dissolver. 35

The Sand Grinder. 39

Colloid Mill and Sub-Micron Disperser. 43

All opinions and claims expressed in the following articles are strictly those of the manufacturers of the various pieces of equipment discussed and do not necessarily represent editorial endorsement by this publication.

Spencer Kellogg and Sons, Inc.
ADMINISTRATIVE OFFICES AND RESEARCH LABORATORIES, BUFFALO 5, N. Y.

May, 1959

A MESSAGE OF IMPORTANCE TO ALL PAINT MANUFACTURERS

Dear Friends:

"LOOK BEFORE YOU LEAP." *An old saying, but it is just as timely today as it was 100 years ago.*

We refer to the manufacture of the so-called "miracle" outside house paint. It may move fast and its revolutionary razzle-dazzle may be just the thing to lure John Q. Public...TEMPORARILY!!

Exaggerated claims for outside house paint containing newly-introduced paint vehicles may lead to sales spurts. Smart promotion schemes may keep such sales on a temporarily *high level. But the best promotion scheme in the world won't protect your reputation against product failure.*

In the Spencer Kellogg Research Laboratories our chemists are constantly testing all types of outside house paints for use on wood surfaces, including a number of those recently placed on the market. Not a single one has been found to contain the combined values *inherent in a good linseed oil outside house paint:* application without costly preparation... one-coat hiding power... excellent adhesion to weathered, chalky surfaces... elasticity... and gloss retention.

Your reputation will stand the test of time when you use time-tested products. In our opinion, there is, to date, no adequate substitute for linseed oil outside house paint. *It may be old, but it is not old fashioned.*

Sincerely yours,

Spencer Kellogg and Sons, Inc.

LINSEED OIL— *"The Life of Paint"*

BALL AND PEBBLE MILLS

By
O. H. Garlick*

WITH the work week getting shorter, and the coffee breaks longer, it behooves every paint manufacturer to make a careful analysis of his ball and pebble mill operations.

It is my opinion that a vast majority of manufacturers are not taking advantage of the most practical operating procedures and formulating techniques. Where an honest effort has been made to improve these, results have been astonishing and far beyond anything that had ever been anticipated only a few years back.

An example of the capability of a properly operated mill is the report we have had from one of our local manufacturers. In a 5 x 6 ft. pebble mill, which is considered an average size, he has been able to turn out in a 24 hour day, 2000 gallons of architectural enamel to a plus 7 grind. Five man hours are required for loading, discharge, and thinning. The only other expense worth considering is 8 horsepower of electricity during the entire cycle.

Such results are made possible by devoting a little extra effort to the development of proper formulation for the grind, and by taking advantage of practical techniques involved in the successful operation of these mills.

Operation

The known principles covering the operation of a ball mill, or pebble mill, have been publicized to a considerable extent, but to repeat them, they include the following:

Proper size, quantity, and type of grinding media
Speed of mill
Amount of material in a batch
Consistency of the material

Load Level

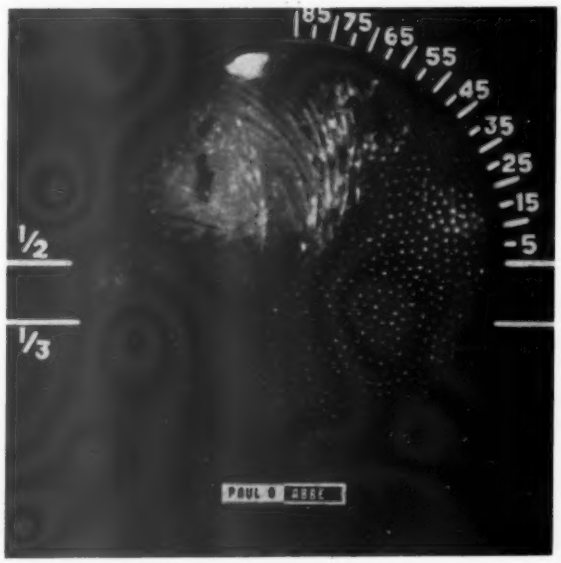
The operator who has some form of measuring stick to periodically check the load level of his grinding media is going to maintain the highest possible efficiency. Neglect in this respect can mean longer grinding time, lack of uniformity in the finished material, and excessive wear to the grinding media and lining. As our slow motion film indicates, it is only by having the charge of grinding media at the halfway mark that we can get the correct cascading action.

Grinding Media Size

Selection of the proper size grinding media results in the fastest possible grind, better uniformity, and elimination of excessive wear which can cause contamination.

So many operators are under the impression that large mills should have large grinding media, and small mills small media. This is erroneous. Regardless of the size mill, the smaller the grinding media that will effectively disperse the pigment aggregates, the better and faster the job.

We have many mills, some 8 ft. in diameter, using pebbles no larger than those normally supplied with a 1 quart laboratory mill. Results have been excellent.



View of half charge of steel balls under correct operating conditions.

*Paul O. Abbé. Inc., Little Falls, N. J.

The use of large pebbles on the average paint product has been an unsatisfactory operation from almost the inception of the pebble mill, and accounts in good part for the switch to some other form of grinding media.

Where small pebbles have replaced larger sizes, results have closely matched even those of the high density media at a fraction of the cost, and with less wear to the linings.

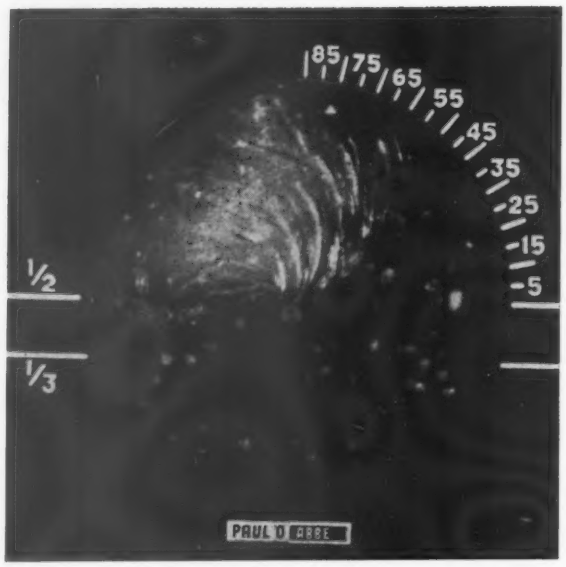
The largest size we have been recommending for paint grinding has been our #00 which runs from 1 to 1¼ inches. In recent years, the trend has been to the smaller C-3 and B-2 pebbles. The C-3 pebbles measure ¾ to 1 inch, and the B-2 5/8 to ¾ inch. Besides the fact that the smaller media grind faster and much more efficiently, they are also considerably better in quality. Therefore, they do not present the cleaning problem inherent in the larger sizes.

The other types of grinding media are also most effective when the sizes used are in the smaller range. We very rarely have furnished anything larger than a 1¼ inch high density ball, and preference has been for the 1 inch. The average steel ball in any size commercial steel ball mill is ⅝ inch, with some manufacturers being happy with the ¾ inch, which appears to be about the maximum size.

Speed

Much has been written about the correct operating speed of a mill. All of our mill speeds were primarily established on the basis of the estimated critical speed. The larger the diameter of the mill, the slower the critical speed, and it is for this reason that the smaller mills run at a faster rpm than the larger units. We have basically established speeds of 60% of critical for the smaller range of mills, 55% of critical for the medium sizes, and 50% of critical for the larger.

Conceivably, 10 to 20% faster speeds would prove advantageous in the development of a faster grind. However, in the initial premixing stage high speeds can cause throwing of the media, or permit a cluster to drop from the high point in the mill. This results in contamination and excessive wear. The easier way to avoid it is by holding to the slower range in speed.



This view of pebble mill operation shows the correct angle of break and normal spread of the grinding media where recommended viscosity range is used.

These rules for speed only apply to paint and products of a similar nature. Where an actual grinding job is involved, as in the reduction of glass frit, it has always been our policy to run at least 10% faster because we need the more severe grinding action to break up the individual glass particles.

Viscosity

We also find that the use of high viscosity formulations become a little more critical where high speeds are involved.

We are not too exacting in the matter of viscosity. For flint pebbles and porcelain balls, the recommended range is 75 to 90 Krebs Units — for high density media 110 to 115 Krebs Units— and for steel balls 100 to 115 Krebs Units. These viscosities permit reasonably close contact of the grinding media, thereby providing the most efficient grinding action, yet creating a film around the media that precludes any possibility of excessive wear. There are exceptions but these figures are best for average conditions.

There is practically no limit to the types of product that can be handled in a ball or pebble mill, the exception being extremely viscous materials that will not flow. With such items there would be no way of unloading the mill. However, we have taken many products that are extremely thick at room temperature, and by the application of heat prior to grinding, these were thinned out to a good grinding consistency.

Our jacketed mills are capable of inducing the necessary heat by the circulation of steam, hot water, or oil. In a few rare cases, the product is being preheated in kettles and then pumped into the mill for grinding.

Grinding Time

Grinding time will vary depending upon the nature of the product and the amount of work necessary to develop a finished batch. It is very rare for anyone to exceed an overnight grind. Where latest formulating and operating techniques have been developed, the grinding time is mostly in the 4 to 8 hour range.

In our own laboratory we have been able, with low solids, to produce an 8 grind of a white enamel in 1 hour that, under the old system of high solids loading, had required 48 hours. We were able, at the same time, to increase our pigment loading, which resulted in obtaining a larger finished batch than was ever possible with the high solids type of operation.

Types of Media

Flint pebbles, porcelain balls, and the high density media, are

(*Turn to page 93*)

Brilliant Achievement!

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Marbon 1100 TMV Resin

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These new 1100 TMV-based coatings combine the interest and appeal of color with the brilliance and durability of aluminum — they decorate and preserve steel, masonry, asphalt, non-ferrous metal, virtually any surface. Colored Aluminum Coatings will open big new markets for you . . . 1100 TMV makes their future excitingly bright!

Write for technical information on Marbon 1100 TMV Resin

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BW Marbon

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She's seen the Cargill series explaining why linseed oil is still the finest base for outside paints. She's been pre-sold. And you, as a member of the paint industry, benefit.

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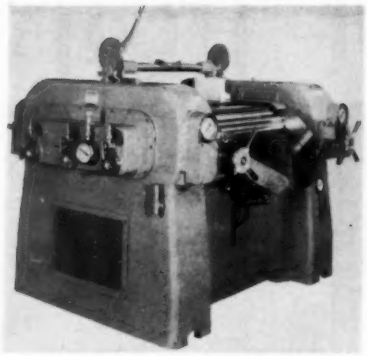
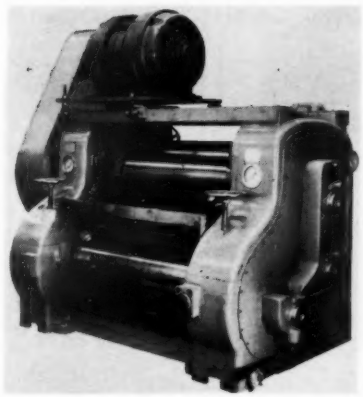
ROLLER MILL OPERATION



Three roll horizontal mill.



Three roll vertical mill.

ROLLER mills are used extensively in paint manufacture for grinding large quantities of paste in relatively short periods of time. These mills are equipped with hardened chilled iron rollers which are hollow for internal water cooling. The rolls are mounted so that they are all in the same horizontal plane, or in a combination of horizontal and vertical planes, or at an angle.

Roller mills usually consist of three or more rolls which operate at different speeds, forcing the material between the rolls and subjecting it to a thorough shearing action. The operating principle of the roller mill is a positive shearing action caused by the forced displacement of the product in an ever increasing degree as it passes through the nips of the roller.

Operation Methods

One of the important factors in the operation of roller mills in terms of output and fineness of grind is the consistency of the paste. The greater the consistency (or viscosity), the greater will be the shearing effect which will break up the agglomerates more completely. The general practice today is to grind in concentrated paste form to take advantage of the greater shearing action. In this connection, several recommendations based on vehicle solids for efficient roller mill grinding have been advanced. Vehicle solids of 80% or more is said to give excellent grinding; however, many have found that 60 and 50% vehicle solids gave good results.

Another important factor for good and efficient dispersion with the roller mill is the diameter of the roller. It has been found that roller mills have better grinding characteristics in direct ratio to the decreases in roller diameter. This is due to the greater concentration of the shearing areas because of the sharper curvature on the surfaces. Size selection depends on production output requirements, number of color change-overs, need for flexibility in plant operation, etc.

One particular feature of the high speed three roll mill is that it will produce a high degree of dispersion at fairly high output rates. Of course, the nature of the pigment (its particle size and hardness), degree of pigment wetting, gloss requirements, the operator, etc. will influence the output.

There are a few concrete rules for obtaining optimum dispersion efficiency with the roller mill worth mentioning. These are: (1) mixing of paste prior to the milling should be as complete as possible to insure wetting and uniformity; (2) the mixed paste should be formulated to leave out as much as the vehicle as possible (remainder of vehicle and thinner can be added after milling). Adhering to these simple rules should give production rates as high as 10,000 gallons of finished paint in an 8 hour working day with a high speed three roller 16″ x 40″ mill.

To reduce human error in roll mill setting, some roller mills are equipped with simplified controls such as sight gauges to set a mill for a specific grind. Push button setting is a recent innovation.

Reconditioning

With any piece of production equipment, and the roller mill is no exception, wear over a period of

(*Turn to page 94*)

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Now you have a *choice* of coating resins for the high gloss you see here. UFORMITE F-222 urea formaldehyde resin or UFORMITE MM-57, new, high-gloss, fast-baking *melamine* formaldehyde resin.

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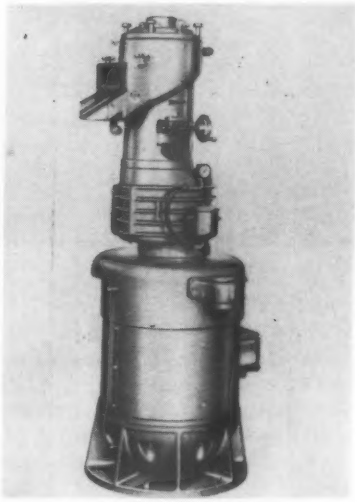
THE MOREHOUSE MILL AND THE COWLES DISSOLVER

IN THE modern competition for faster, more economical production of high quality paints, no two machines have come into such wide acceptance as the Morehouse Mill and the Cowles Dissolver. Their impact on the industry has been little short of revolutionary. Operating on original high speed principles, the two machines alone constitute the basic processing equipment of a growing number of paint plants, and are most in demand where versatility and big volume in small space are required. Each features compactness, light weight, low manpower requirements and simple maintenance, with relatively low cost. Each is available in a wide variety of models from laboratory size to large production models. Processing results are easily duplicated throughout the range of sizes.

The Morehouse Mill

The manufacturer is now introducing two wholly new production models with increased stone size and speeds to give a 30-50% gain in capacity over former models, with no increase in external size. At the same time, sweeping engineering improvements in the entire line give closer control of particle size and increased reliability and longer life for the machines. Chief among improvements is an all new, more rugged spindle assembly for smoother, more trouble-free operation.



Model 2800 mill.

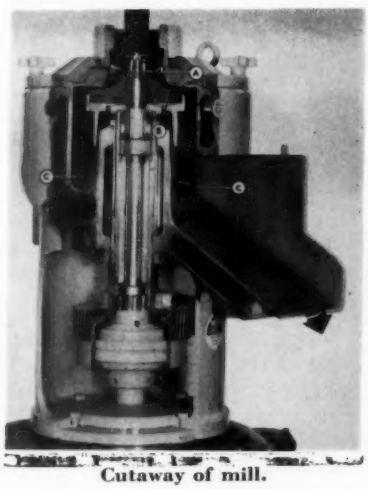
Mill Applications

With capacities demonstrably greater than those of conventional equipment, Morehouse Mills are used wherever precise particle reduction is required. Applications include grinding, dispersing, mixing, emulsifying, homogenizing and disintegrating—all concurrently. Costing less to install and operate, the mills are applicable to a wide variety of paints, varnishes, lacquers, enamels, inks and various coatings and glazes.

Principle of Operation

The "Morehouse Principle" of high speed attrition milling was originated over a generation ago and has been continuously improved. The principle is based on the actions which take place between the faces of two stone discs; one stationary, one rotating at speeds up to 11,350 feet per minute at the periphery. The lower (rotor stone) is under constant adjustable control to precise position in relation to the upper (stator) stone during operation. Clearance ranges from positive contact to approximately one-quarter inch distance from the upper stone. The Morehouse principle is further distinguished from slower, more cumbersome methods by (1) the small size, special design and formulation of the stones, (2) the extremely high speed rotation of the "rotor" stone, (3) great accuracy of the patented precision adjustment controlling the clearance between the stones.

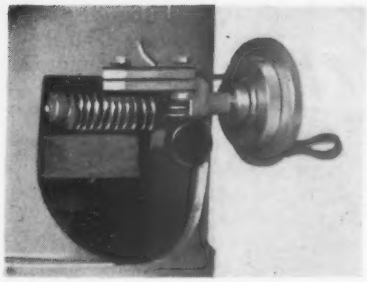
In the mill (see cutaway photo) inflowing material at top is broken up by patented mixer blades. Blades pump material through a center opening (a) in the stationary upper "stator" stone. Particle reduction and other actions take place (b) between the stator and lower (rotor) stone. In a micromist, the finished product is thrown off from between the stones into the processing chamber (c) with terrific force. It then pours out through the spout. Mills may be gravity or pump fed.



Cutaway of mill.

Micrometer Adjustment

An external handwheel quickly



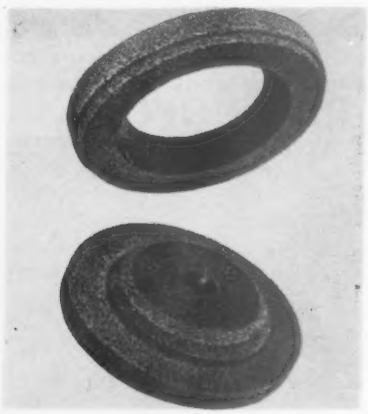
Handwheel for adjustment.

raises and lowers the rotor stone by .001 inch steps while the mill is in operation. Following adjustment the mill can be locked into processing position. Accuracy and precise duplication of end products is thus assured on all mill models during normal operation.

Special Stones for Efficiency

Fifty years of milling experience have resulted in advanced design and formulation of grinding stones. To insure efficient processing all Morehouse Mill Stones are specially made and a wide selection of various rotor-stator combinations is always available.

Highest production rates are reached at minimum temperatures, quietly and without vibration. The stones are self-sharpening, remain true and do not glaze. No dressing is required during their useful life. Stones are easily replaced in minutes.

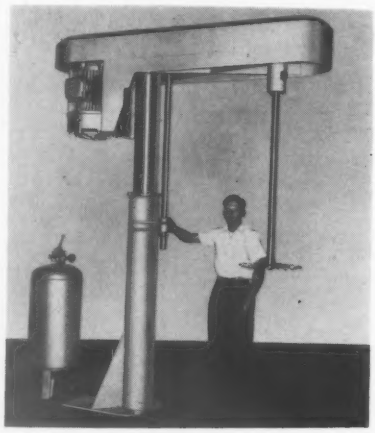


Grinding stones.

New models increase the capacity range of the line to from 4 to approximately 4375 gallons per hour. Motor ratings are from ¾ to 50 H. P., with stones from 2″ to 8″ in diameter. Peripheral speed of the stones in various models ranges from 1880 to 11,350 fpm. New mechanical features include larger stones, improved spindle for greater efficiency, positive lock on micrometer setting, and easier maintenance.

The Cowles Dissolver

The Cowles is today the one machine most in demand for dispersing and mixing jobs, with a range of application practically unlimited. This revolutionary ultra-high speed unit handles a wide variety of jobs in paint production. The unique teeth of the patented Cowles impeller provide the most effective dispersing action yet developed, for increasing both volume and product quality. Production rates are often 20 times faster than those of conventional equipment.



Cowles dissolver.

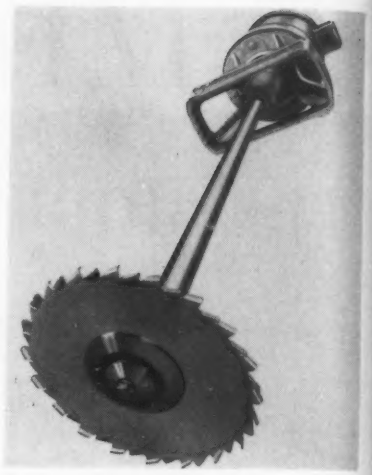
Applications

The Cowles is widely used in the paint plant for pre-mix, letdown and other operations requiring ultimate dispersion, dissolving, emulsifying and deagglomerating. It handles solid-liquid, liquid-liquid and gas-liquid dispersions with ease, in viscosities in excess of 50,000 centipoises. Through speed and thoroughness of dispersion it markedly increases the efficiency of milling and other subsequent equipment.

"Multi-Phase" Mixing Principle

- -it's the impeller teeth that make the difference

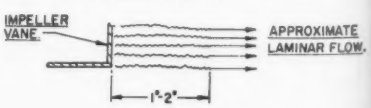
The speed and effectiveness of the Cowles dissolver are due to its patented impeller. The narrow impeller vanes travel at speeds up to 6000 feet per minute. This direct mechanical action imparts extremely high velocity to material, creating a zone of intense turbulence immediately surrounding the impeller. The material is forced rapidly outward through itself. As the high velocity material impinges on the surrounding slower moving portions, "hydraulic attrition" takes place. This attrition is a combination of violent impact and shearing of particle against particle. The hydraulic action greatly multiplies the mechanical action of the impeller. Most of the actual work of dispersion is thus accomplished by the action of the suspension on itself. A portion of the impeller energy is converted to laminar flow, keeping the entire batch in constant "Total Motion."



Cowles impeller.

Only with this type of impeller is the hydraulic attrition effect obtained at maximum speed and efficiency. Splash or dead spots are no problem. Proper selection and location of the impeller, and proper selection of tankage assure the desired amount of work on the materials, with controlled flow patterns in the tank.

1. Imparts high velocity to materials.
   - - 3000-6000 F. P. M. in production models.



(*Turn to page 95*)

PH

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Printed with New Heliogen Viridine Y

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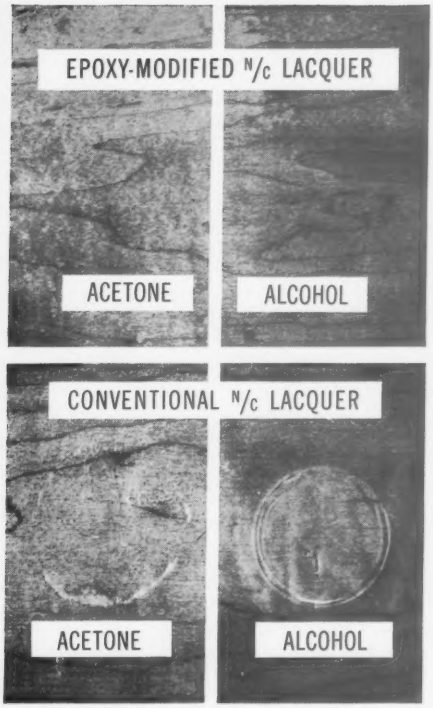
Printed with Heliogen Green GA

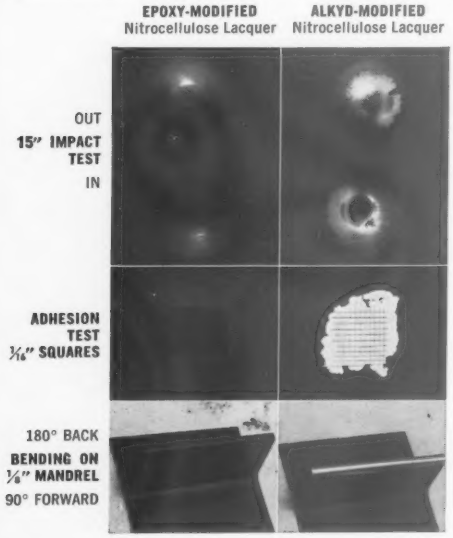


These panels, subjected to identical treatment, show the resistance of epoxy-modified nitrocellulose lacquer to spills of alcohol or acetone (nail polish remover).

Du Pont shows you how to give nitrocellulose lacquers 9 lives

by adding the chemical resistance of epoxies

On Unprimed Aluminum, tests show the superior adhesion and durability of epoxy-modified nitrocellulose lacquer (below) made by new technique.



Lacquers with excellent solvent and chemical resistance . . . tough, durable lacquers easy to rub and repair . . . lacquers with deep gloss and lasting color are now being prepared by adding epoxidized oil and urea formaldehyde resin to nitrocellulose formulations.

You can produce pigmented as well as clear lacquers which can be used to brush, spray, or dip woods and even unprimed metals.

The opportunities presented by this development are large. The information you need to make a decision about your own lacquers has been put into two bulletins by our Sales Development Laboratory. For copies, write to Du Pont Explosives Department, Wilmington, Delaware.

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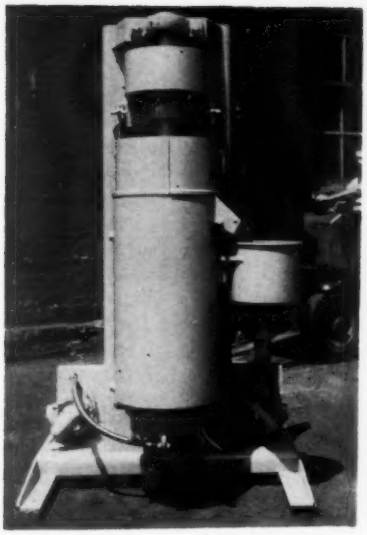
Better Things for Better Living . . . *through Chemistry*

THE SAND GRINDER

By
I. C. Quackenbush*



Typical production size sand grinder. A single speed motor for the agitator and a variable speed pump drive mechanism are hidden from view in this picture. Floor space of this 16-gal. size is less than 17 sq. ft., the height just over 7 ft., and the weight only 3100 lbs.

NO longer the incomprehensible adolescent of the finishes family, the Sand Grinder has been lived with, studied, tamed and trained, and is now an accepted member of the group of tools found profitable in a highly competitive industry. The purpose of this article is to report in a general way where it has been used, how it has been adapted to a variety of plant sizes, products and manufacturing systems, and some directions in which it may be going.

The theory and basis of its operation has been well covered otherwise and will not be carried further here. Physically, the sand grinder consists of a small jacketed cylinder containing a charge of sand and a slender "agitator," fed continuously by a positive displacement pump. By varying pump speed, dwell time of the product is controlled. Coarse paste is fed to it from low-level (1 HP/100 Gal.) premixers. Sand is retained in the vessel, neither lost nor ground into the product. As with other mills, several sizes are necessary and available covering output ranges between 3 and 1000 GPH of finished product. The paste produced is roughly similar in body to ball or pebble mill pastes.

(1) "Official Digest" March, 1958, D. G. Bosse.

*Chicago Boiler Co., Chicago, Ill.

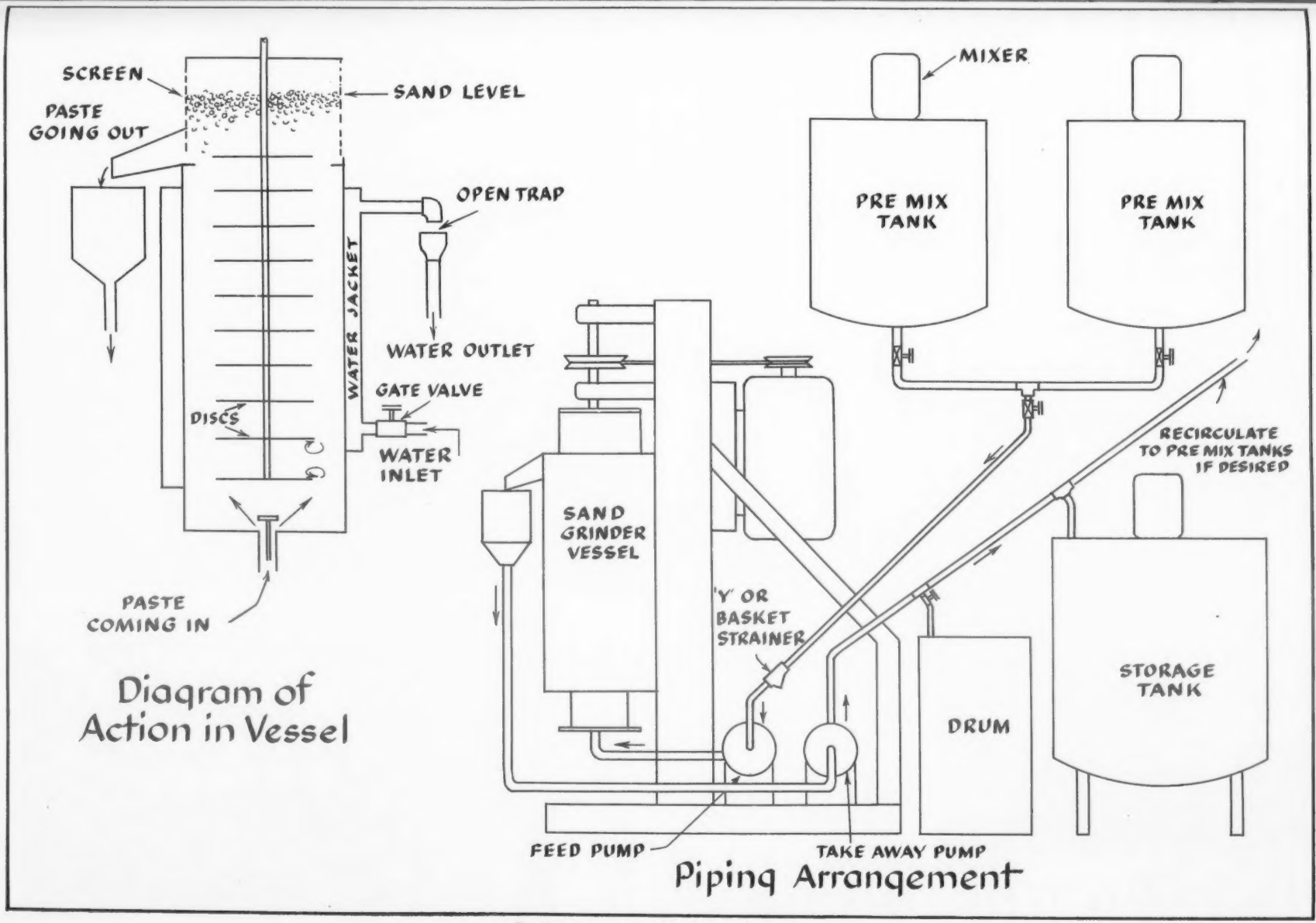
Product Range

The product range is very wide. Top-grind high-gloss finishes were the obvious first uses of the sand grinder, and the first users were makers of automotive and industrial finishes. Its success in producing off-scale whites led to its being tried right down the line on both organic and inorganic colors, and it was found almost impossible to "stump" the unit. Naturally there were pitfalls, and techniques had to be worked out to suit odd conditions. Pigment quality gained importance, vehicle reformulation became necessary where previously this degree of dispersion was unattainable, and some materials were definitely set outside the range of of the sand grinder. Beaded blacks, large flakes, and inerts over 325 mesh cannot be processed with it.

With excess capacity available, several users tried successfully to extend their ranges, finding that trade sales items, architecturals, primers, and even low-grind flats could be produced well. Here it was found that since top grinds were unnecessary or even undesirable, that almost fantastic rates of output were available with good control of gloss, grind and color. There were a number of especially hard-to-handle materials which worked well, and several manufacturers flatly claimed that some that were impossible by other known means were processed satisfactorily. Thixotropic, heat sensitive and color sensitive materials especially fit the high-shear, low retention time factors, and quite naturally, the "headache" products in the line headed the early trials in many plants.

Advantages

From the standpoint of production people, the sand grinder has proved a boon in its speed of setup for rush orders, its ability to grind almost anything on a one-pass, immediately usable basis, and to quickly react to differences in pigment quality which often had shown up too late in other mills. A single mill, if only one were had, could be used for different colors or even entirely incompatible products. Several mills have bought their berths by salvaging previously rejected products which had been given up as unusable, with only a single pass reprocessing. No plant is too big or small, for a



Production set-up for the sand grinder.

Newly available laboratory types offer close correlations with plant units. This laboratory mill will grind average pastes off-scale at 3 to 10 GPH.

3-employee plant has next to the largest size mill, while another has a single laboratory unit on production runs, each paying its way.

The first mills were, to be conservative, unkind to operators. True, they were quiet, and fast, but they were plagued by stoppages and were difficult to clean between colors. These flaws were especially noted because the first installations were single machines, often asked to handle a wider range of products and colors than would have been dared on any other mill. Both these flaws were, fortunately, capable of correction by mechanical revision. Line stoppages were traced to sand or pigment contaminants getting into places where they should not have gotten. A fool-proof check valve cured the one,—a coarse built-in strainer cured the other. As for color carryover and cleanup, a complete piping revision and relocation of parts removed some 41 pipe threads, and the use of smaller, sanitary-type tubing eliminated pockets. Elimination of vessel crevices and certain gaskets helped, so it became almost never necessary to dismantle machines, even between drastically different colors or vehicles. Washup is now fast and easy, and in many cases batches are left half-completed overnight, ready for immediate next-day start-up, with only screen brushing to prevent setting-up.

Maintenance

Maintenance has never been hard, and is carefully assisted in design. The operator needs no kit of tools, for the parts he removes are thumb-screwed. The parts of the mill requiring regular maintenance are standard motors, pumps, and bearings, none of them strange or unusual. The most often worn parts are the pumps, which are heavy-duty gear-types, operated at such low speeds that even highly abrasive pigments do not severely shorten their normal lives. They run satisfactorily from six months to several years before demanding inexpensive repairs. Admittedly sketchy but conservative life figures average about one year. Sand does not wear out in normal service; some machines being traced for eight years without change. A new screen material has almost eliminated this source of failure from wear. No part of the machine weighs more than can be comfortably handled by common equipment.

Safety supervisors have assisted in establishing necessary standards which are rigidly adhered to. Belts are static conducting where used, all electric equipment is explosion-proof, and moving parts are tightly guarded. A well-thought-out control system is used, one which kills the whole machine if any of several safeties is actuated, and manual reset is necessary. Spills and floods are infrequent, slow in developing, and usually telegraph their intent clearly to an alert operator in sufficient time to be prevented.

Cost justification for the sand grinder is not at all difficult. Several users not only state that their intention is to replace worn equipment with it, but have already replaced slower and less efficient mills. First cost is very low. Three typical, conservative project are shown in Table I.

There are no special building requirements, for weights of the grinders are between 1100 and 3800 pounds. The power drawn, being so low, allows use of existing lines. Labor cost is no higher, but operator comfort is increased.

Several patents cover the sand grinder and the process, and it is licensed on a low-cost, very fair basis. Information on this phase is available from *Du Pont Fabrics and Finishes Division, Wilmington, (98) Delaware.*

The sand grinder of today is not the sand grinder of a few years ago. Continuing improvement is widening its use to include inks, tape coatings, colors in oil, textile finishes, paper chemicals, and others not fully tested or too competitive to discuss.

	Average Output G.P.H. Paste	Mill Price	Mill H.P.	Premixers (2) Gals. Each	Total H.P.	Total Installed Cost
"3 Gallon"	20–40	$1950.00	5.5	55	7.5	$3000.00
"8 Gallon"	50–70	3600.00	16.5	300	22.5	8000.00
"16 Gallon"	120–150	3850.00	21.5	500	31.5	9000.00
"30 Gallon"	200–300	4400.00	31.5	1000	51.5	11000.00

The figures shown are necessarily safe averages, based on about 100 installations. Output figures are for ball mill pastes, and installation costs represent in-plant labor.

Table I. Three typical project costs.

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COLLOID MILL AND SUB-MICRON DISPERSER

By
L. H. Rees*

MANTON-Gaulin manufactures two pieces of equipment for the pigment dispersion field, namely, the Colloid Mill and the Sub-Micron Disperser. To a degree, they will overlap in their usage, but in the main each has its own niche in the field of dispersion.

Colloid Mill

We will consider first the Colloid Mill, starting with its construction. Figure 1 shows the cutaway view of the mill assembly and it should be noted that all wetted parts are stainless steel or equivalent in corrosion resistance. The product enters at inlet A, drops by gravity unless mill is pump fed to the front of the rotor (X). The front of the rotor (X) contains an impeller section which furnishes an intensive mixing (Note: rotor speed 20,000 r.p.m. on 2" Mill) and provides the pressure to force the product across the periphery of the rotor (X) and then into the actual close clearance working area between the rotor (X) and the stator (Y). The product then flows around the rotating shaft seal (Z) to the outlet (D). This simple and compact assembly contains a

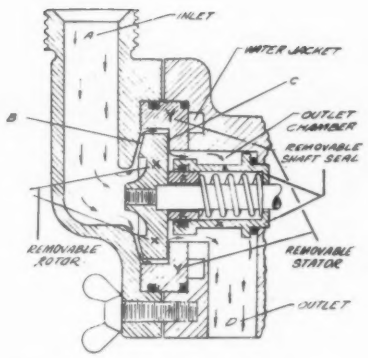


Figure 1. Cutaway view of colloid mill.

number of interesting and, we believe, unique design features. First, in the working area (C), the product is flowing countercurrent to centrifugal force, which permits a longer working or dwell time for the product, with a shorter travel distance in this working area than if the product was flowing with centrifugal force. This means that less horsepower is required to do the same quantity of work on the product, since the frictional loss in the mill will be directly proportional to the working area at a constant clearance. Secondly, once the front cover has been removed and the rotor (B) unscrewed the balance of the working parts slip from the mill housing without the use of tools. This included the stator (Y) and the seal assembly (Z). This ease of removal, as some of our detergent advertisements say, makes cleaning almost a pleasure. It also facilitates the work of the maintenance crew, as parts can be examined and, if necessary, reconditioned without handling the entire mill assembly.

This brings us to our third point, that since these parts can be so readily removed, they can also be readily replaced with spare parts, eliminating down time.

The fourth point, the same removal feature, permits the use within a single mill body of a wide variety of rotor and stator materials to meet varying product requirements. For pigments, the standard combination furnished is alundum on the rotor and ceramic on the stator; however, stellite or carbides could be readily interchanged for either rotor or stator, should this be desired for special applications.

To conclude the mechanical portion of the mill, all mills are built for operation with a rotor peripheral speed of 10,000 ft. per minute which permits the use of various size mills with the minimum of product variation. All mills are constructed with the mill body flange mounted directly to the motor providing the most compact assembly possible. Table I furnishes the specifications for the three sizes of Gaulin mills currently offered as stock units.

All of the mills are water jacketed for cooling and all are equipped with direct reading rotor adjustment, graduated in .001" to facilitate the setting of the clearance between rotor and stator. This adjustment can be made with the mill in operation and is readily recalibrated for "O" setting to compensate for wear.

Production rate of the Colloid Mill is an extremely difficult figure to furnish since it is dependent upon the viscosity of the material, the degree of dispersion required, and whether the mill is being gravity or pump fed. For this reason, most manufactures furnish production rates as water capacities of the mill which actually will have no relationship to the production rate of a dispersion. As an ex-

*Manton-Gaulin Manufacturing Co., Inc., Everett, Mass.

Model	Ave. H.P. Req.	A	A1	†B	†C	D	E	Inlet Connection Size & Type	Discharge Connection Size & Type	Net Wt.	Gross Wt. Crated	Crated Dimensions L	W	H
2A	2	17½	21¾	10½	11⅜	4½	4¾	1" Sanitary	½" Tubing	155#	190#	34"	15"	17"
4A	7½	20¾	30¼	17½	16	6¼	6½	1½" Sanitary	1" Sanitary	435#	485#	36"	25"	25"
8A	30	26	40¼	23½	16	7½	10	4" Sanitary	1½" Sanitary	750#	810#	44"	39"	28"

†On 2" Mill — when by-pass Tubing, 3 way valve, one quart tank are furnished dimension B will be 13" and dimension C will be 23"

Table I. Specifications for three sizes of Gaulin mills.

ample, the 2 H.P. mill with the .003" gap setting would have a production of 130 GPH with water, but might only be 25 GPH with a water base paint or paper coating. With a .005" gap setting, on water the rate would be 175 GPH, whereas a dispersion would probably be 40 to 50 GPH. Capacities for the 7½ H.P. mill would be approximately three times that of the 2 H.P. and the capacity of the 30 H.P. would be three to four times that of the 7½ H.P. Gap settings as low as .0005" have been used successfully. However, when working at extremely close clearances, it is recommended that the setting be made by flow rate rather than by thousandths of an inch, with about 8 GPH being the minimum flow rate permissible. This again would be multiplied by a factor of 3 for the 7½ H.P. mill and 9 to 12 for the 30 H.P. mill.

Processing

Both the Gaulin Mill and Sub-Micron Disperser units are designed for dispersion problems and are not intended for grinding. Where actual reduction of the ultimate particle size is required, ball mills, micro-pulverizers or some other type of equipment must be used. The Colloid Mill is primarily used for dispersing agglomerates in pigments or fillers having an ultimate particle size larger than one to two microns. It may be used either in aqueous or resin solvent systems with viscosities as high as 5000 to 8000 cps., but is especially recommended for the low viscosity range of up to 500 cps. It is used for water base paint dispersions, for conventional semi-gloss and flat interior or exterior paints, leather coating, and paper coating dispersions. It is also useful as a pre-disperser unit for the Sub-Micron Disperser where bead form carbon black or organic pigments having very small ultimate particle sizes but containing large agglomerates must be pre-dispersed prior to processing in the SMD. It is an extremely useful unit in plants running small batches of various colors due to the ease of cleaning.

Sub-Micron Disperser

The Sub-Micron Disperser takes over where Colloid Mills and other types of dispersion equipment leave off. Due to its principle of storing energy under extremely high pressures and then dispersing by the instantaneous release of this energy, it is especially suited for carbon black, organic pigments, vat dyestuffs, etc., having extremely small ultimate particle size and requiring very high energy levels to separate agglomerates. The mechanical action of the SMD is as follows:

It is a combination of a high pressure pump and a dispersion valve. The pigment feed is drawn into the pump cylinder, pressurized at 5000 to 8000 p.s.i.g. and is then discharged through the Sub-Micron Disperser valve, where the actual dispersion takes place. The pressurizing, in addition to providing force to move the material at high velocity through the disperser valve, assists the vehicle to wet the pigment by compressing absorbed air in or on the pigment agglomerates to 1/530 of its original volume. The pigment, with the air still in this compressed condition, enters the disperser valve where there is an instantaneous pressure drop to atmospheric, and a corresponding instantaneous acceleration of flow to velocities as high as 57,000 ft. per minute. At this velocity three actions take place:

1. Extreme turbulence, cavitation and shear.
2. Rapid expansion of gas within the pigment cluster, causing explosion of the particles.
3. A shattering impact against the impact ring surrounding the orifice. This Sub-Micron Disperser Assembly is shown in Figure 2.

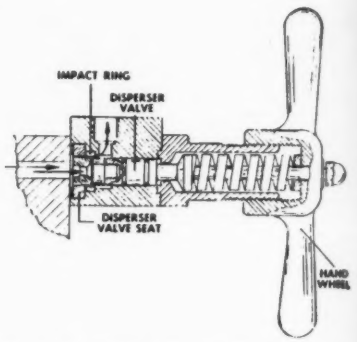


Figure 2. Sub-Micron Disperser assembly.

The complete Sub-Micron Disperser unit, Figure 3, is a rugged cast base which contains motor and power transmission mechanism to actuate a stainless steel pumping assembly through which the product is forced to the SMD valve, Figure 2 assembly, where the action of dispersion takes place.

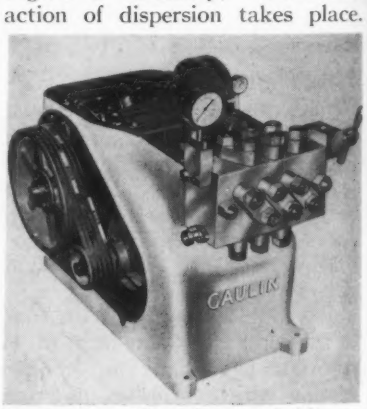
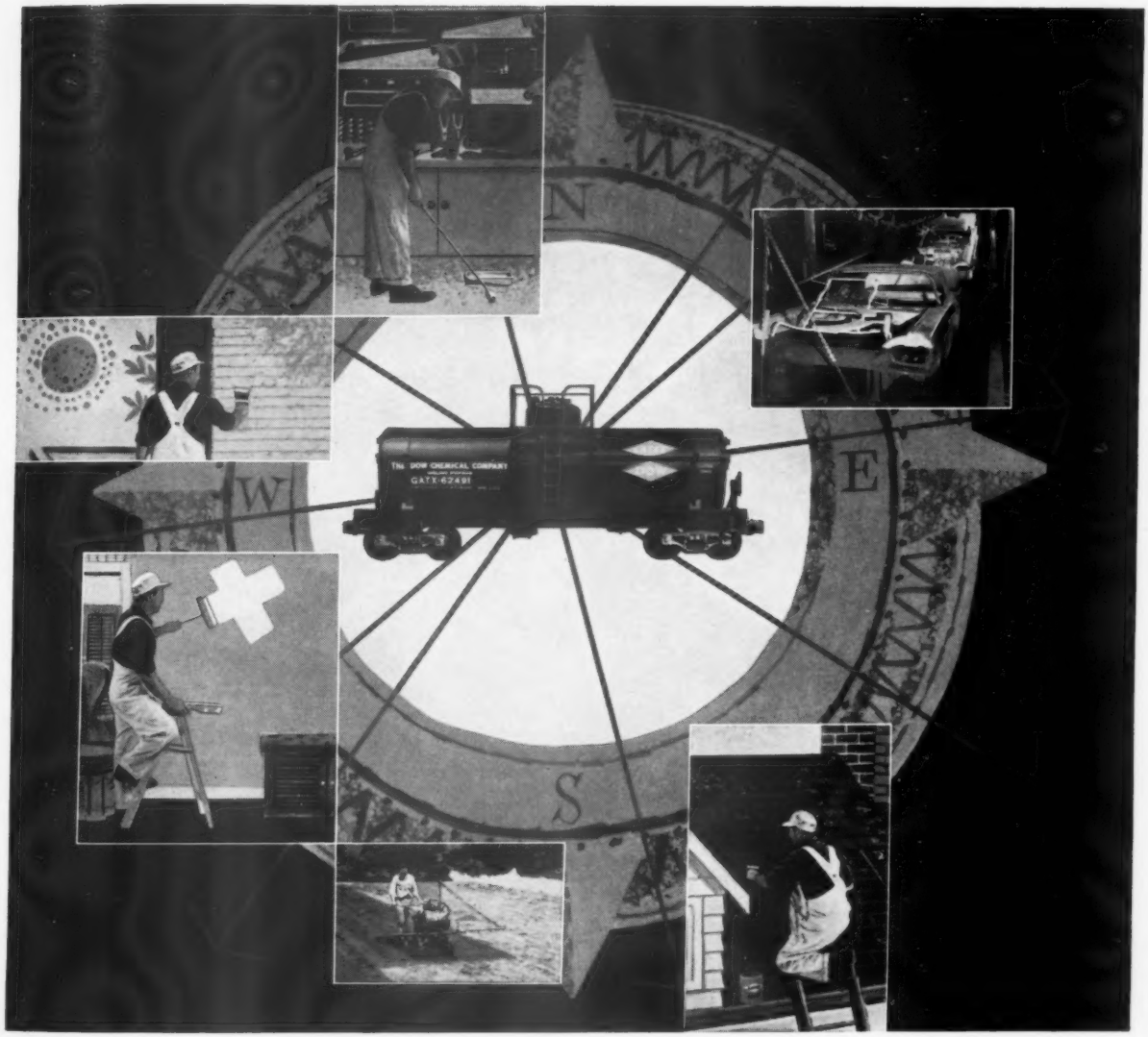


Figure 3. Complete Sub-Micron Disperser unit.

The pump assembly itself is a three-plunger pump, each plunger pumping to a common discharge manifold to maintain uniform flows to the SMD valve assembly. The pump valves are of ball construction and the seats of a removable type for ease of maintenance and replacement. Wear in a unit of this construction is primarily con-

(Turn to page 96)

DOW | LATEX



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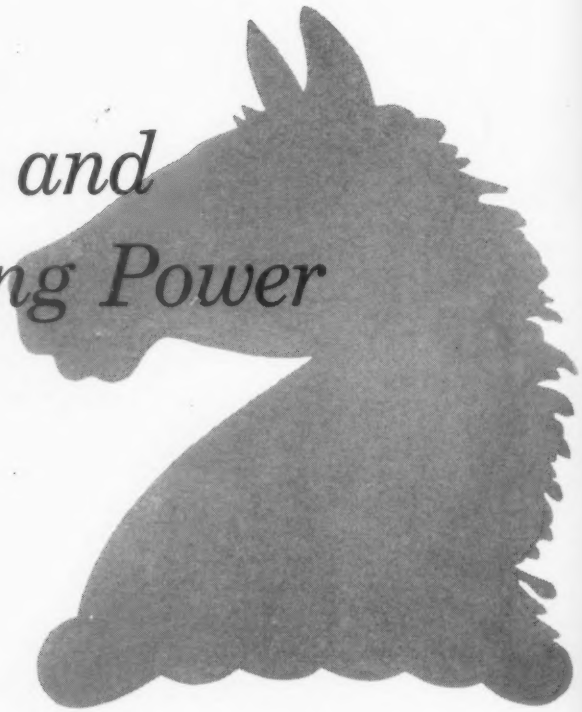

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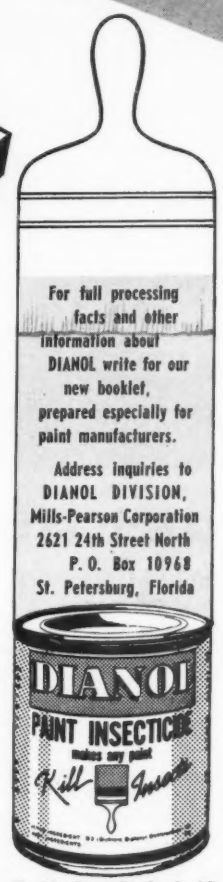
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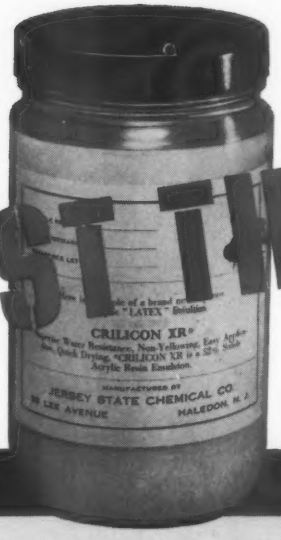

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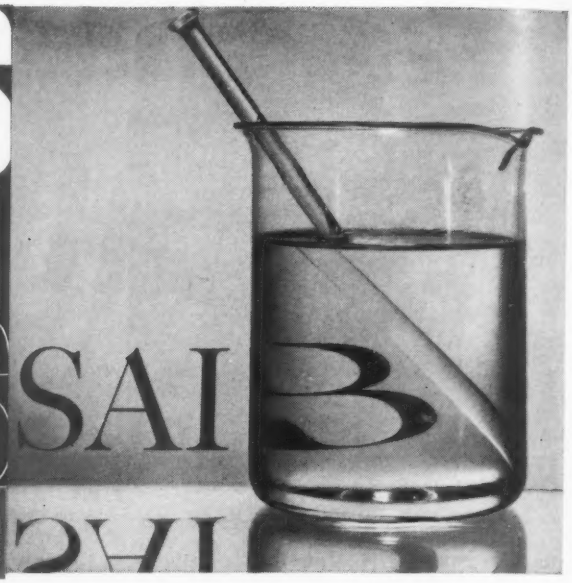
in the finish



Sucrose Acetate Isobutyrate, new resin modifier-extender, exhibits low color *and* excellent color stability

Sucrose Acetate IsoButyrate (SAIB) is an unusual compound of immediate interest to all who are concerned with the formulation or performance of protective coatings.

Consider these characteristics:

Its color and clarity are a sparkling water-white.

Its color stability on exposure to ultraviolet light is excellent.

Its color stability on prolonged heating is excellent. Example: samples heat-aged 6 days @ 350°F showed only a 9 Gardner color change, from 1 to 10.

Its color stability in the presence of other lacquer ingredients is excellent. Example: in metallic pigmented lacquers, SAIB does not produce a "greening" effect with bronze powder.

Lacquer film formers may be highly modified with SAIB and still show unusually good film tensile properties and hardness. The low solution viscosity of SAIB permits formulation of high-solids lacquers at application viscosities. Higher non-volatile content results in greater coverage per gallon of lacquer and reduced solvent requirements. Formulas are often simplified, too, through replacement of several lacquer-modifying components with SAIB. Film adhesion and permanence is improved in many cases.

To see how easy SAIB is to use, and how little it affects film properties while significantly increasing solids content, simply add it to your present lacquer—try 5 to 10% by volume of total lacquer to start with—spray it, and observe the result.

SAIB has been evaluated in standard formulations for melt coatings, for wood lacquers, paper coatings, cloth coatings, metal lacquers and lacquers for plastics.

For example, nitrocellulose *wood lacquers* containing SAIB show an unusually high film hardness, even at high modification. In Half-Second Butyrate coatings its presence gives an unique visual depth of finish. In *paper coatings*, its use results in very high gloss and good adhesion. In *cloth coatings*, abrasion resistance and appearance are improved. The freedom of color of SAIB is often a distinct advantage in formulating *lacquers for plastics*. In *vinyl and acrylic solutions*, replacement of part of the film former with SAIB improves sprayability and decreases cobwebbing. In *hot melt coatings*, SAIB greatly extends the basic film former.

Few commercial compounds so high in molecular weight display so compact a structure. The outstanding stability of SAIB is attributed to this dense molecular configuration.

Another unusual property of SAIB is its extremely high viscosity at room temperature and sharp decrease in viscosity with addition of heat or solvents. At 30°C, its viscosity is about 100,000 centipoises. At 100°C, the viscosity drops to 90 centipoises. A 90% solution of SAIB in Tecsol®, Eastman proprietary ethyl alcohol, exhibits a viscosity of only 750 centipoises at 30°C.

For handling convenience, SAIB is sold both as a 90% low-viscosity solution, designated *SAIB-90*, and in the 100% unmodified form, designated *SAIB*.

Many other coatings applications for SAIB are being investigated by our Customer Service Laboratories. May we help you evaluate this unique material? For this service or for a sample of SAIB, write to Chemical Sales Development Department, Chemicals Division, Eastman Chemical Products, Inc., Kingsport, Tennessee.

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A Staff Report

Cyclized Rubber in Protective Coatings

Part V

(*Conclusion*)

This, the final installment of the series on cyclized rubber, covers pigmentation of cyclized rubber in formulating chemical-resistant coatings and heat-resistant paints. Application techniques of cyclized rubber paints for best performance are also discussed.

TYPE and extent of pigmentation influences to a large degree the final properties of a paint film. Careful selection of pigments depends on the application purpose and their behavior with other materials, especially the binder used in the formula. In addition, the proper selection of pigment to binder ratio is of utmost importance in formulating high-quality corrosion-resistant paints.

Chemical-Resistant Coatings

For the pigmentation of chemical resistant cyclized-rubber coatings, which are to be exposed to strong acid or alkali solutions, the following pigments have found to be of value because of their inert properties.

Titanium dioxide, silicon carbide, red iron oxide, yellow iron oxide, black iron oxide, chrome oxide green, chromium oxide hydrate, and miscellaneous types of carbon blacks. In addition to inert pigments, basic or reactive pigments can also be used for primers such as zinc oxide (various grades) lithopone (60% and 30%), red lead (low and high dispersibility).

Zinc oxide pigments can be also utilized for chemical resistant op coats. It also will impart increased weather resistance when used in outside applications. Numerous experiments have demonstrated that zinc oxide in cyclized rubber films behaves as well as titanium dioxide during prolonged exposure to alkalis and acids. The reason for this behavior is found in the extremely good wetting and non porous coating around the pigment particles caused by the cyclized rubber binder. Table XI enumerates the results of such tests. A cyclized rubber Aroclor composition was used as a binder, pigmented with zinc oxide, zinc-white, or titanium dioxide and permanently exposed to acid or alkali conditions.

For formulating light colored paints, zinc oxide pigments alone are not recommended because of poor coverage. Mixtures with titanium dioxide are always used. Depending on application, the percentage of TiO_2 lies usually between 10-50%. It must be also mentioned that silicon carbide pigment in combination with titanium dioxide R and NR have proven their value in outside coatings.

The importance of pigmentation in influencing chemical resistance has been mentioned before. An optimum is usually obtained at a pigment volume concentration of 20%. For outside paints which are usually exposed to a lesser degree to chemical attack, this value should not be surpassed, and 15-20% by volume should be used in the pigmentation of final coats which amounts approximately to a pigment to binder ratio of 1:1 by weight. A higher pigmentation impairs durability and the protective value as well.

Primer and intermediate coats can be pigmented with 25-40% pigment by volume of the solid film. As a rule the prime coat which is important in imparting adhesion of the entire paint system to the

Chemical	Pigmentation	In solution	Vapor phase
Sulfuric Acid 5%	Zinc Oxide	4.5	5
	Zinc white	4.5	5
	Titanium dioxide A	5	5
Hydrochloric Acid 5%	Zinc Oxide	4.5	5
	Zinc White	4	3.5
	Titanium dioxide A	4.5	5
Phosphoric Acid 5%	Zinc Oxide	5	5
	Zinc White	4.5	5
	Titanium dioxide A	4	4
Nitric Acid 5%	Zinc Oxide	3.5	5
	Zinc White	3	4
	Titanium dioxide A	3.5	5
Sodium hydroxide Sol. 5%	Zinc Oxide	4.5	5
	Zinc White	3.5	5
	Titanium dioxide A	4.0	5

5 = Total Protection (Coating unchanged)
3 = Limited Protection (Coating attached)
1 = No Protection (Coating destroyed)

Table XI. Protective value of cyclized rubber coatings with various pigments after two months of exposure.

substrate should be somewhat lower in pigmentation and never by over-pigmented.

Extenders

The inert extenders and fillers which are used in cyclized rubber paints play an important role.

The most important ones are listed below:

Barium sulphate	Micro talcum
Misc. grades of asbestos	Silicate flour
Mica powder	Diatomacious earth

Especially advantageous is the incorporation of flake, leaf and fibre-like fillers such as micro-mica, micro-asbestos in small quantities which cause the formation of dense and closed films through leafing. For outside exposure, these pigment are effective against radiation, their improving durability.

The use of micro-talcum, diatomaceous earth as for instance "Microdol" prevents hard settling of heavy pigments and extenders. On the other hand diatomacious-earth results in less solvent retention and increased mechanical properties of the films. As a rule, silicon carbide and quartz powders improve the abrasion of cyclized rubber paints.

Zinc Dust Paints

During the last few years highly pigmented zinc dust paints have obtained a greater degree of importance in the corrosion protective coating field resulting in cathodic protection of iron surfaces. A carefully determined binder to zinc dust ratio is requested. The lower limit of the zinc dust content in the dry film must be 90-92%. For various reasons (reactivity of the zinc dust) neutral binders are the most suitable ones for such paints. In the form of cyclized rubber, the paint industry has a binder at its disposal which conforms to the requirements in this field of application due to its chemical properties. It is understood that type and quality of the zinc dust have an extremely pronounced influence upon the paint and film properties of such paints. Particle size and zinc oxide content play a very important part. Therefore, it does not seem possible to arrive to at an established standard formula because binder, plasticizer and other additives have to be adjusted to the properties of the zinc dust. It must be observed that the zinc dust content never drops under the minimum quantity specified. Zinc dust paints based on cyclized rubber gives corrosion resistance, and if properly formulated, have good storage life without resulting into hard pigment settling.

Heat Resistant Paints

Cyclized rubber is furthermore suitable for heat resistant paints. Selection and choice of pigments are extremely important in this instance. Besides considering the influence of temperature, the other requirements such as outside durability and chemical resistance have to be considered. For temperatures up to 200°C. an Alpex/Alkydol S-1043 combinations is recommended using a pigment to binder ratio of 3:1 by weight. Suggested is a mixture consisting of red iron oxide—zinc chromate at equal parts and some asbestos flour. Such a binder composition is also suitable for baking finishes which are resistant against boiling water. In this instance the addition of a small quantity of diphenoxy-ethyl-formal is necessary.

For coatings which have to stand up under severe conditions 400-600°F., cyclized rubber should be modified with a suitable alkyd resin. The pigments to be used must naturally be heat-resistant; such as aluminum powder and zinc dust. It is well known that under such high temperature conditions the vehicles suffer severe destruction making it necessary to pay special attention to the pigments to be used. If too much binder is used, it may be a disadvantage, causing blistering.

Cyclized Rubber Varnishes

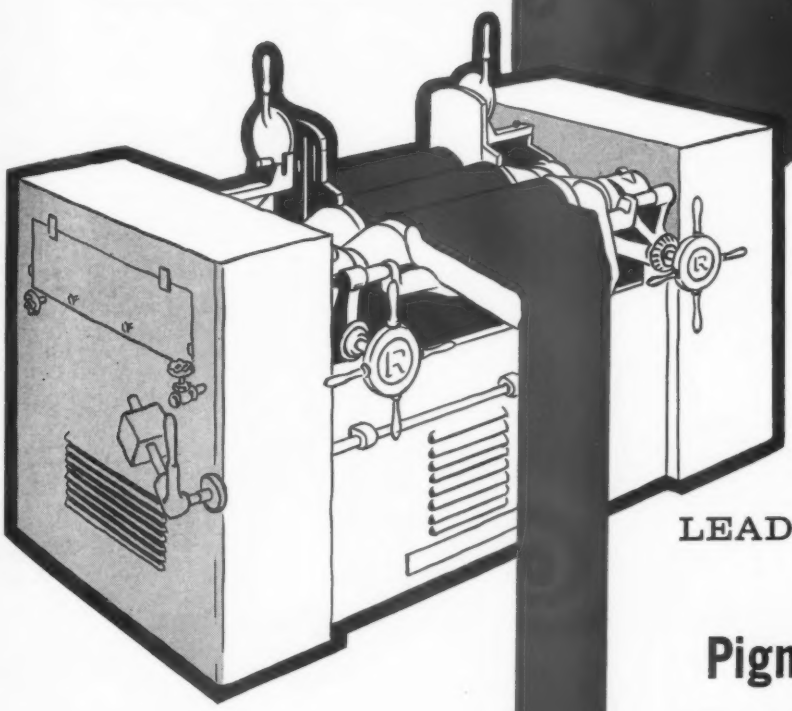
The preparation of cyclized rubber varnishes is usually done at ordinary or room temperatures. The simplest way is to use cyclized rubber in solution form as supplied to the trade, and modifying it with the necessary binder solutions selected for this purpose. The hard cyclized rubber resin is used for special purposes, if, for instance, the use of mineral spirits as solvent has to be excluded in preparing fast drying varnishes using VM&P naphtha. The granulated resin is dissolved under constant aggitation, and if necessary at moderately elevated temperatures. It is then combined with other raw materials forming the complete binder.

The solid cyclized rubber resin can also be combined with drying oils and stand-oils under well known varnish making procedures. Depending on the viscosity of the oils, cooking temperatures of 260-280°C. have to be used. Cooking with wood oil is difficult, and not recommended. Generally speaking, cooking does not result in any advantage over cold blending.

The use of mineral spirits is preferred as the solvent and diluent due to its harmless properties from a physiological point of view. Its sole use permits the

(*Turn to page 97*)

Count Your ADVANTAGES



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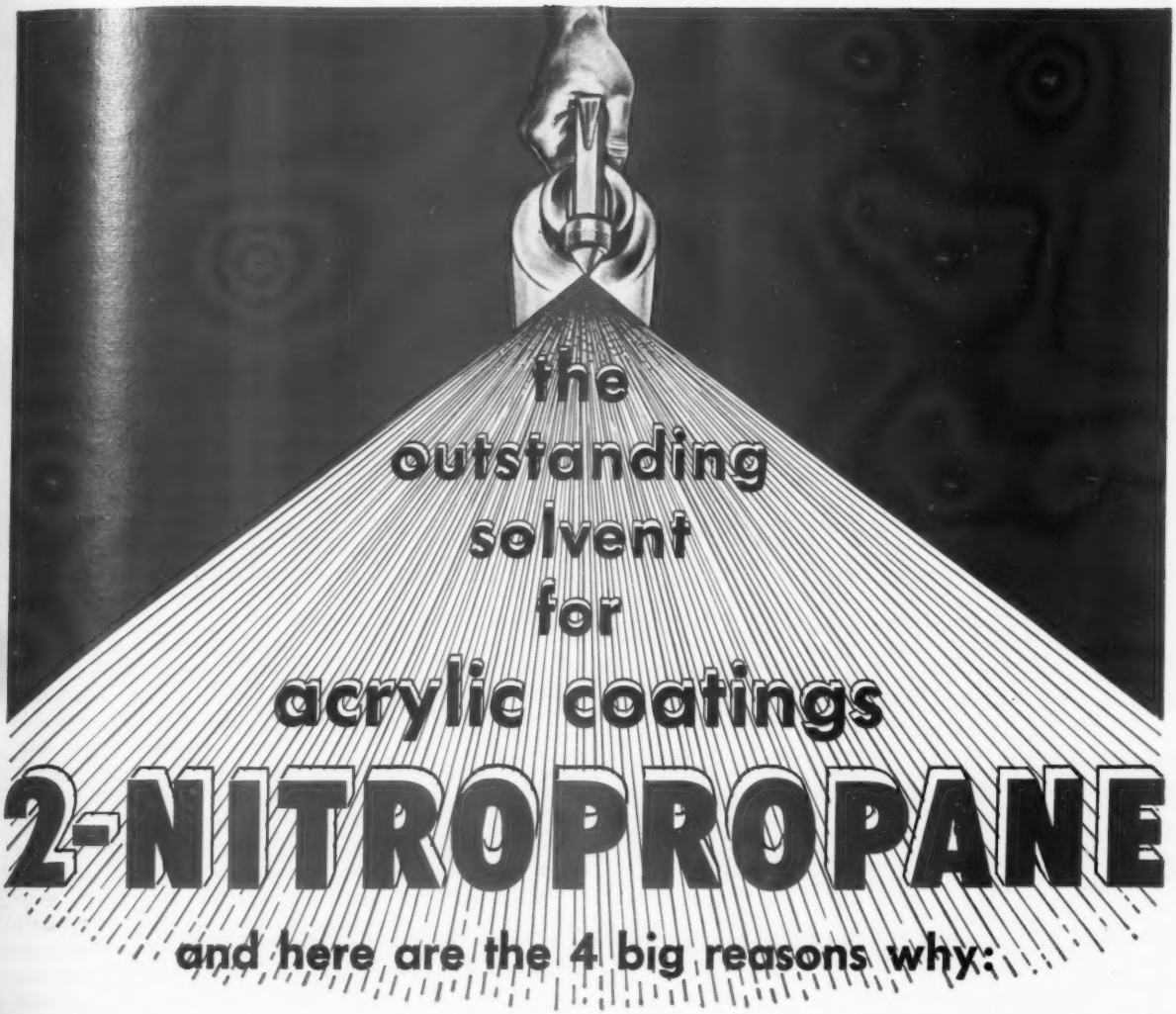

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- Films deposited by 2-NP show excellent solvent release.
- Use of 2-NP reduces cutting time.

Chart to the right shows the excellent solvency characteristics of 2-NP-Toluol blends for the resin B-82. Get the full story on why 2-NP is so outstanding in acrylic resin formulations.

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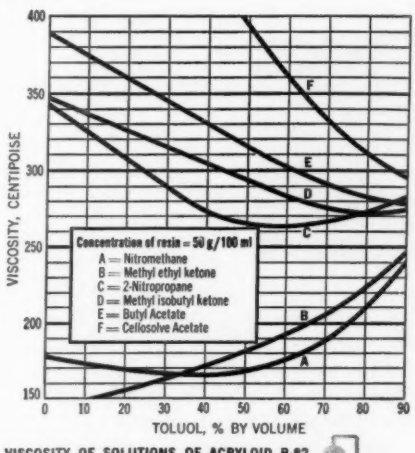

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By
Phil Heiberger

The author continues his random reflections on various aspects of the paint industry. The opinions expressed in this column are his alone and do not necessarily reflect those of this publication.

It's fairly axiomatic that individuals with similar education, training, and work experience tend to approach given problems in similar ways. As a corollary, it might be stated that scientists trained in different disciplines tend to approach the same problem in entirely different ways.

P. Heiberger

The strength of large research organizations, universities, and even small "brain-storming" groups, most people recognize, stems from the diversity of background and experience of the member contributors, while the most serious weakness of the paint industry, as a whole, can surely be traced to the lack of such diversity. Consequently, many forward looking members of our industry have been bending their efforts toward the development of ways to overcome the stifling conformity of viewpoint and method that plagues us. Imitation may be the sincerest form of flattery, but it rarely leads the way to green pastures of invention and discovery.

What this industry needs, then, is an increased awareness of the kind of thinking being done in other scientific areas. This is not to say that we should completely abandon our characteristic modes of problem solving in favor of intensive study of other scientific disciplines, nor that we might expect to make frequent direct use of the learnings of other sciences. It is merely a contention that deliberate investment in a little more familiarity with bodies of knowl edge outside our natural spheres of interest would pay handsome dividends. Guidance toward the solution of thorny problems is hard to come by and ill afford to overlook any possible sources of inspiration or suggestion.

To be specific, I am thinking right now about our long-standing battle against those microorganisms that cause paint spoilage and unsightly growth on our paint films. Our traditional approach is simply to poison these microorganisms, thus inhibiting a series of undesirable transformations.

Just as the destructive purposes of exterminators dictate their need to study insect physiology, metabolism, and pathology, so do the purposes of paint chemists dictate their need to study the chemical habits of microorganisms. There's a very good chance that a little more knowledge of microbian chemistry might just turn the trick for us. Let's take a quick look in that direction.

Microbian Chemistry

As a student I knew well that the microbiologists had a veritable arsenal of microorganisms at their disposal, but as the years went by and my biochemical friends scattered to various sections of the country, this knowledge became somewhat obscured.

It's true that in recent years there has been a widespread growth of the fermentation processes in the pharmaceutical industry, and that products such as antibiotics, vitamins, steroids, hormones, and other medicinals have been spotlighted in the popular press, but in spite of this, these developments have been uppermost in my mind of late.

That is why a "popular" review article in the February, 1959 *Journal of Chemical Education* entitled "Transformation of Organic Compounds by Microorganisms" by D. Perlman jarred my memory. In a reference made by the author to F. H. Stodola's book, *Chemical Transformations by Microorganisms* (J. Wiley & Sons, N. Y., 1958), it was stated that more than 1400 examples of the use of microbial systems can be cited.

Specific Transformations

In this article Perlman confined his discussion to changes that do not alter the basic structure of the molecule. In many cases, the synthetic activities of microorganisms are rather difficult to carry

out chemically; their development has not been inhibited by comparatively high costs and low yields.

Although there are many others, Perlman limited his discussion and examples to 12 types of important transformations. These are:

1. *Oxidations* where oxygen is added to the molecule or hydrogen is removed.
2. *Reductions* where hydrogen is added to the molecule or oxygen is removed.
3. *Specific hydrolyses* where water is added to a certain linkage followed by splitting of the molecule.
4. *Decarboxylation* where carbon dioxide is eliminated from the molecule.
5. *Deamination* where amino groups are removed from the molecule resulting in formation of a keto acid (oxidative deamination), formation of a double bond (desaturation), or replacement with hydrogen (reductive deamination).
6. *Amination* where an amino group is introduced into the molecule.
7. *Phosphorylation* where phosphate esters are added directly to the molecule.
8. *Transfer reactions* where glucoside residues, amino acid residues, or phosphate residues are transferred from one molecule to another without apparent participation of water in the reaction.
9. *Racemization* where optically active compounds are converted into enantiomorphs.
10. *Dehydrations* where water is eliminated from the molecule.
11. *Demethylation* where a methyl group is eliminated from the molecule.
12. *Condensations* where two aldehydes are joined.

Disadvantages Too

Although it may seem so, the present discussion is not an appeal to recruit microbes for the paint industry. The fact is that the organic chemist enjoys certain advantages. At least he is master of his syntheses and has the option of duplicating his work or modifying the size of his operation at will, according to his needs and available equipment. The biochemist, on the other hand, is somewhat of a nursemaid to his microorganisms.

For example, Perlman states, "In studying the use of microorganisms to transform organic substances a certain amount of knowledge of the techniques of microbiology is needed. If the interest lies in reproducing results reported from other laboratories, care must be exercized in carrying out the fermentations exactly as described, using the same strain of microorganism, conditions, and medium for growth of microorganism, and recovery of the desired material.

"Experience has shown that when different microbial cultures are used with the same substrate (or substance to be transformed) varying results can be expected, and if the conditions for growth of the organisms vary from those reported as optimal, different transformations are likely to occur. . . . . The addition to the growth medium (intentionally or unintentionally) of traces of metallic ions such as zinc will lead to the formation of different metabolic products. . .Another difficulty encountered is that the desired transformation product is often converted to other products if the incubation period with the microbial cells is extended. This may result in the accumulation of undesired products which make isolation of the prized material more difficult and lower the yield of the desired product."

Biochemical Engineering

The combination of biology, biochemistry, and engineering is a relatively new science with a bright future. A textbook on this subject was published a few months ago ("Biochemical Engineering," R. Steel, Editor, The MacMillan Co., N. Y., 1958) in which fermentation is considered as a unit operation. This is a sign of growth because emphasis is no longer on particular products, but on generalized topics such as maintenance of organisms, choice of medium, sterilization, agitation-aeration, and types of equipment.

Although for many reasons (primarily high costs) it is quite possible that we may never enlist microorganisms to provide us with bulk paint intermediates, we must never forget that a little more knowledge of the chemical habits of microorganisms could prove a remarkable boon to our industry by indicating a workable method of inhibiting or preventing undersirable microbial growth and microbial transformations.

All we need, really, is enough knowledge to enable us to formulate our products in such a way that they will not serve as a nutritious broth for hungry microorganisms. Stated this way the problem may sound deceptively simple, but here, as elsewhere, optimism is the best policy.

Algae, Anyone?

Microorganisms, definitely slated for a key role in our future, may yet surprise us with their versatility. Not only on the planet earth can they be useful, but also, according to recent evidence, in outer space.

One of the critical problems that has arisen in connection with space conquest involves the question of how life can exist in a space vessel without a continuing supply of oxygen and food and without the means of disposing of wate.

The answer, of course, is to enlist the aid of microorganisms. In *Missles and Rockets* **4**, 39 (1958), the feasibility of growing algae in muclear submarines and spaceships was outlined. It was stated that a new strain of algae has been developed which multiplies 1000 times a day compared with the 8 times a day in previously employed algae. This reduces the volume of algae required. These algae perform their twin tasks of producing large quantities of food material rich in protein and vitamins, and consuming respired carbon dioxide.

Around the Corner, Utopia

Reassuring as it is to know that microorganisms can solve nutrition and disposal problems in space ships, it is even more heartening to realize that the possibility of solving age-old nutrition and disposal problems right here on earth is not as remote as it once was. For that, unmistakably, is what these remarkable genetic techniques seem to promise.

Faster crop rotation, higher yield per acre, and reduction of air pollution are just some of the feats which might be accomplished through effective harnessing of microorganisms. There is, then, good reason for optimism.

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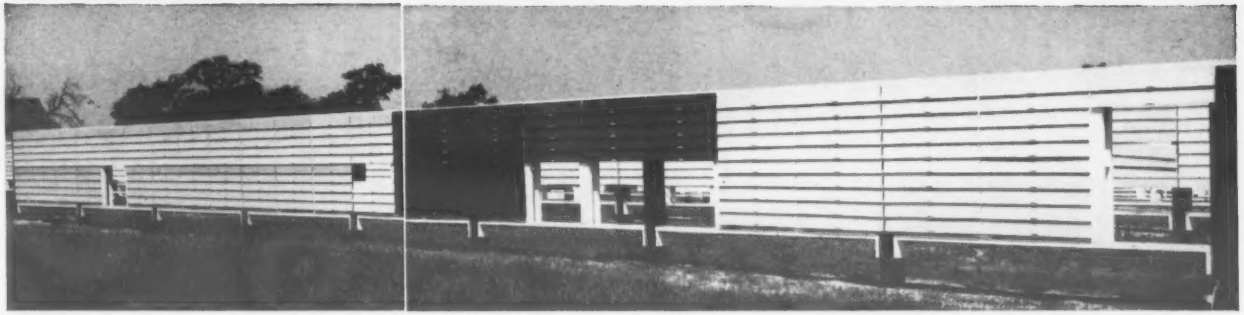

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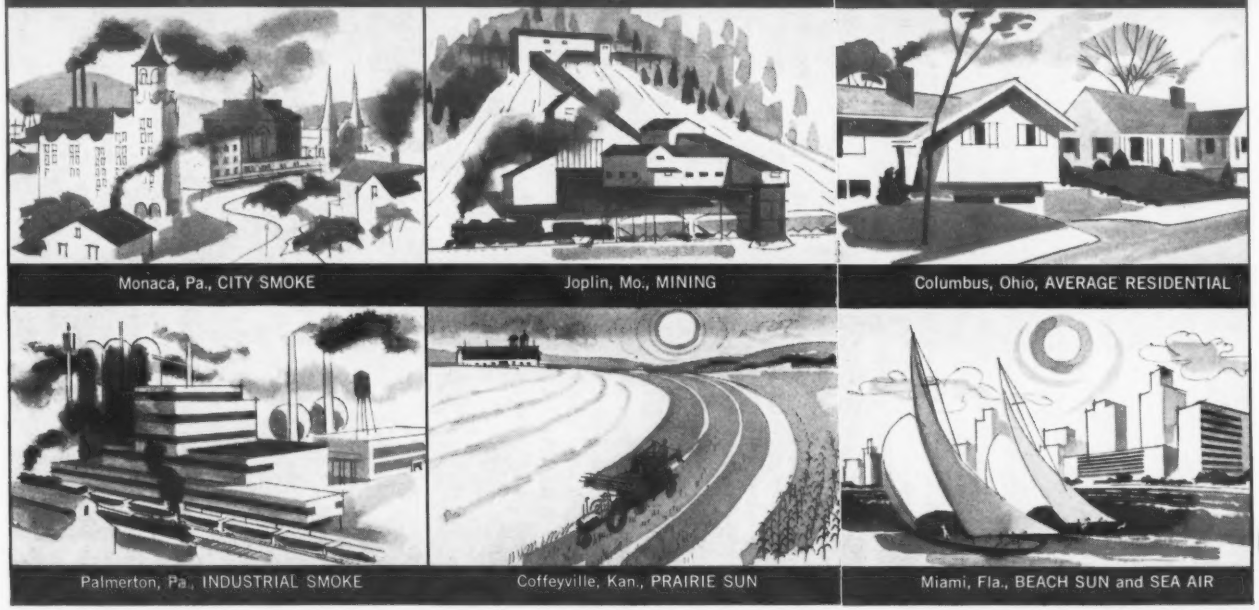
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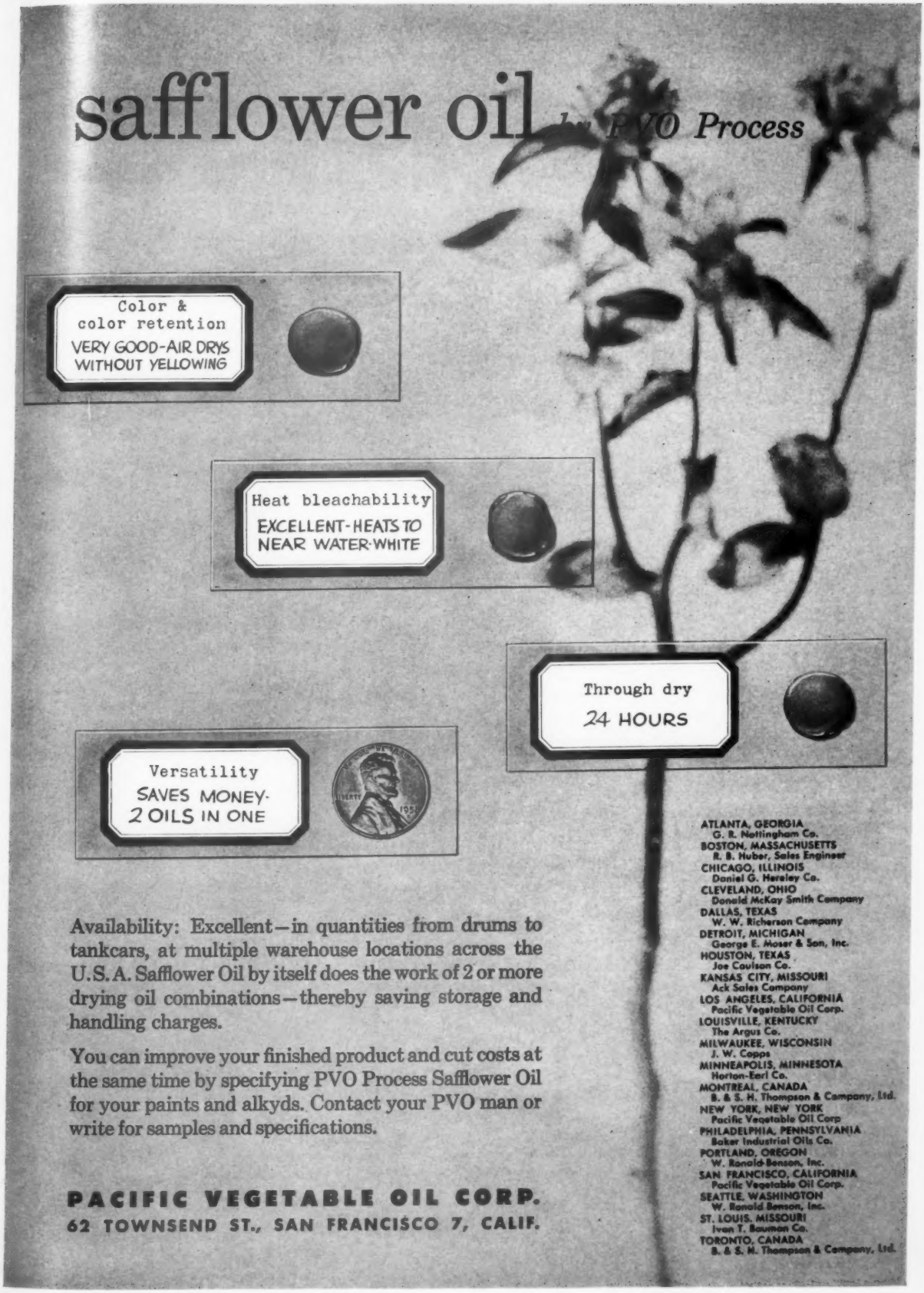

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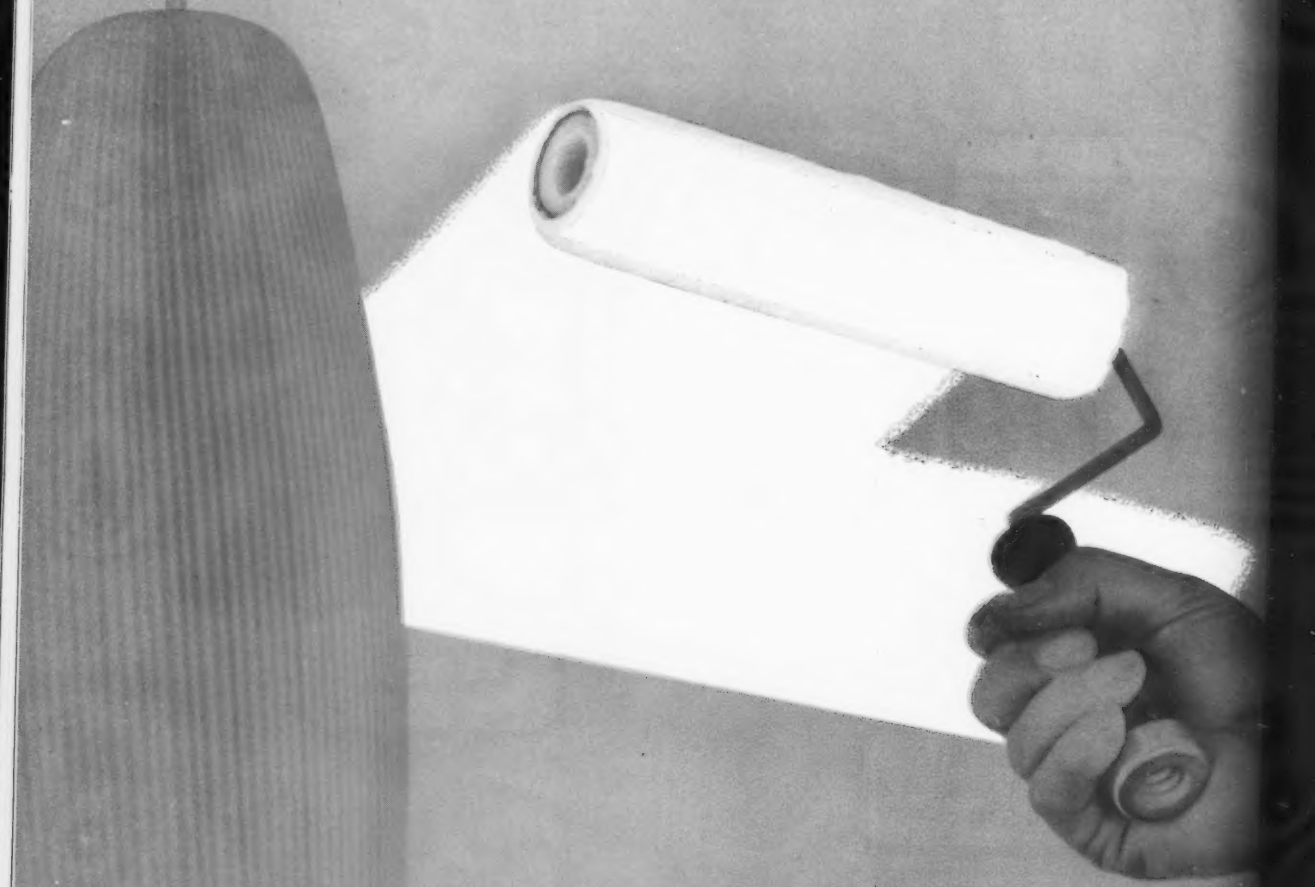

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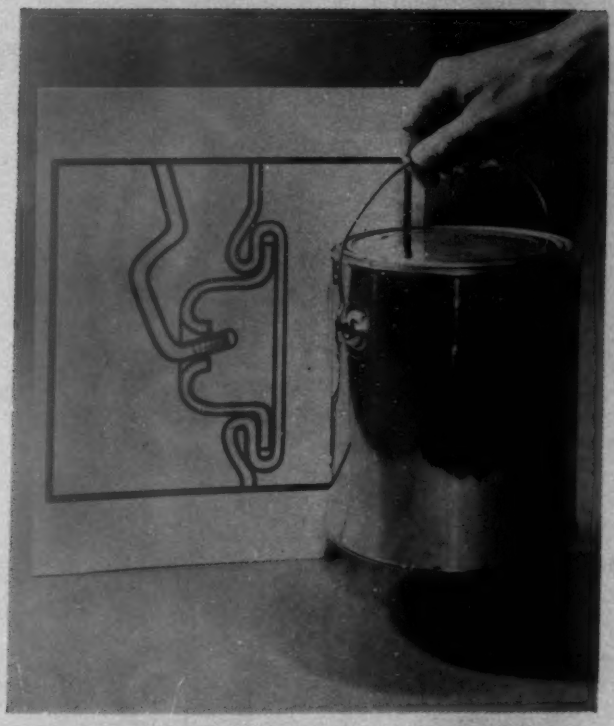

Paint cans with solderless clinched ears construction for accident-proof handling were recently made available to the paint industry. See page 67 for this development.

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EFFECTIVE COMMUNICATIONS

By
Lawrence Shatkin

OVER a decade ago, Alvin Dodd, then President of the American Management Association, said "the number one management problem today is communication." The growth in American productivity depends on team effort, which is contingent on successful communication. This involves cooperation and coordination from the inception of an idea or policy to the completion of the task at hand.

In recent years, the emphasis has been on management getting its story across to the rank-and-file. This downward communication has caused management to neglect the network structure in communication. It flows downward, upward, and crosswise.

Horizontal communication is important to ensure coordination between departments. When consideration is given to a new product, several departmental activities are stimulated, and it is only through effective communication that sales, production, purchasing, finance, and advertising can pool their efforts toward company objectives. Horizontal communication requires top management surveillance and direction. The development of close liason between sales and production is necessary so that each may exercise empathy and avoid a narrow perspective of the field. Specific objectives in the area of production and inventory planning must of necessity take into consideration such areas as optimum customer service, economical operation and minimum investment in inventories. Clear communication will ensure that all parties have the necessary information.

The reason management communication within the management group is important is that it is a prerequisite to worker communication. It is only from an enlightened management that a clear and unilateral interpretation can be made and passed on to the worker.

Keith Davis[1] has described two basic communication patterns. These are depicted in Figure 1.

The cluster means that the greater majority in management circles acted as passive receivers, and only a few (10 to 30 per cent) recommunicated the information. Staff personnel are more active communicators than line personnel, since the former group gather data, sell ideas, coordinate activities and advise management.

The Grapevine in Management

Every company has its own grapevine which range from acute criticism to hearty praise. Although originally thought to apply to workers, scientific research and observation indicates that it is just as active in management circles. Grapevines are created by people of every rank in the corporate structure. The striking feature of the grapevine is the speed with which significant news travels. It is the most direct means of communication. Insecurity quickens the pace with which the news travels.

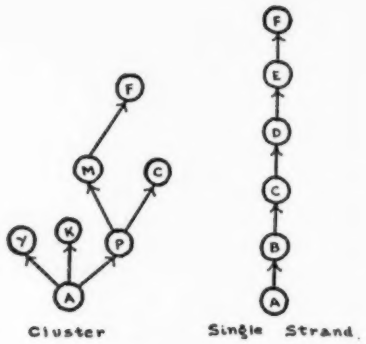

Figure 1.

This area of activity deserves more attention by management. They need to study it, learn how it works and who its key connections are, and develop ways to keep it positive rather than negative.

Communications Research

Four classical research methods have been relied upon: empirical, controlled observation, experimental, and the case study. A study was conducted by R. French and A. Zander[2] with employees in a garment factory, where the company wanted to ascertain the best way of communicating a change in working procedure. Three groups were set up. In the first group, employees were merely told about the change and allowed to ask questions. In the second group, employee committees met with management, discussed the changes, and arrived at decisions concerning work design and job rates. In the third group, employees and management jointly worked out all the decisions regarding the changes to be made.

When the changes were actually introduced, production declined initially for all three groups. In the non-participating group, production remained below its previous

The opinions expressed in this feature are not necessarily those of any particular firm or organization.

1. Q.	Does your company do a good job of telling you what's going on and what's being planned?		
A.	*Answer*	*Plant A*	*Plant B*
	Very good job	18%	55%
	Doesn't do much	22%	14%
2. Q.	Does your foreman ask your advice before deciding things that affect you?		
A.	*Answer*	*Plant A*	*Plant B*
	Hardly ever	65%	40%
	Almost always	11%	26%
3. Q.	Can you talk things over with your foreman when you want to?		
A.	*Answer*	*Plant A*	*Plant B*
	Yes, I always can	34%	56%
	Hardly ever	5%	0%
4. Q.	Do you feel a part of the company?		
A.	*Answer*	*Plant A*	*Plant B*
	I feel I really belong	29%	62%
	I feel I just work here	42%	14%
5. Q.	How does your company compare as a company to work for with other companies?		
A.	*Answer*	*Plant A*	*Plant B*
	Worse than average	4%	3%
	Just Average	35%	19%
	One of the very best	20%	45%

Table I

level and morale was poor. The second group recovered from the decline after two weeks and morale was higher than in the first group. In the third group, however, the previous level of output was reached within several days and output increased by 15%, while morale was higher than in the other groups.

A number of other studies indicated that the combined method of giving instructions verbally and in writing at the same time was found to be most effective, and the purely oral method a close second.

The National Industrial Conference Board surveyed the production employees of two plants operated by the same company.[3] The two groups were matched except that Plant "B" had participated in an active communication program for a number of years. Plant "A" had not been influenced by any such program. The following highlights from the survey's findings underline the intimate relation that seemingly exists between morale and the freedom to communicate (Table I).

Downward Communication

The University of Minnesota Industrial Relations Center has developed a research program to determine the effectiveness of various devices in downward communications. Respondents to a survey agreed that employee magazines can be an aid in communications, but felt these brochures should be mailed to employees' homes. Employee handbooks and manuals should be given to new employees during the induction or orientation period. Bulletin boards are recommended as a means for communication. These should be confined to notices requiring less than three minutes reading time. Notices should be as brief and as simple as possible. These boards should be kept neat, accurate and of high quality. In order to stimulate interest, the news should be up-to-date, by having the bulletin board changed at least once a week. It is advisable to have someone in charge who can see that this means of communication is being put to good use. Letters can be effective if they are mailed to employees' homes. Payroll inserts were considered inadequate. The research project indicated the greater effectiveness of having frequent meetings of small groups of workers and supervisors. The use of public newspapers was not recommended.

Production Project

In considering the extension of the working day, effective communication was of utmost importance. In order to get the cooperation of the employees, it was agreed that a discussion period should ensue between management and a committee of workers. The reason for considering such a move was explained, and an initial plan was outlined. Management stressed that the proposal could only work with the employees' cooperation. Suggestions were put forth by the workers, and after consultation with union officials and employees, the proposition was finalized and put into operation. Here was an instance of upward and downward communication working toward a common goal.

Why Communication Fails

The primary criticism leveled against management communication programs is that it has paid too much attention to media and devices, too little to purpose and content.

Many executives have encountered difficulties because they oversimplified the problem and concept of communications, and sought dichotomous relationships.

It is recommended that management communicates through systems and procedures. Systems provide the new tools both for collecting and interpreting data with speed, and also of working out the means of transmitting it in time to be of value.

The crux of the matter for improving upward communication lies in the executive making himself available to his subordinates. Objectives and goals should be discussed, and a review of performance be made by both parties. In top management circles, upward communication can be encouraged through the introduction of a "management letter" whereby the manager sets his own goals and objectives and explains what is needed to help him reach his destination.

Communication is one aspect of employee relations. Before anything can be gotten across, it is important that a climate of respect and receptivity exist for management.

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2. R. French and A. Zander, "The Group Dynamic Approach," Psychology of Labor Management Relations, Industrial Relations Research Association, Publication No. 3, pp. 73-74.
3. See "Communicating with Employees," Studies in Personnel Policy, No. 129. National Industrial Conference Board, Inc., New York. pp. 36-40.

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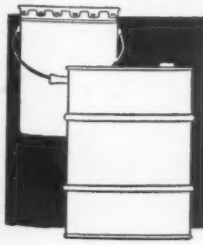

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NEW CAN DESIGN SOLVES PACKAGING PROBLEM

Mercurial mildewcide caused detachment of soldered ears from cans at Benjamin Moore.

Solderless clinched-ear paint cans have solved a mighty "sticky" problem for Benjamin Moore & Co., one of the nation's largest manufacturers of protective coatings.

According to R. W. Jamison, technical director of the company, the firm was troubled by the problem of soldered ears becoming detached from paint cans containing mildewcides or other products using mercurials as ingredients.

The answer to the problem appears quite simple—the use of clinched-ear cans—but the story behind the problem is both involved and interesting.

Neither the use of mildewcides nor the problem of "ear trouble" was a new one for the paint and container industries. Mildewcides were manufactured and sold prior to World War II, but did not contain mercury. And soldered ears always were "pesty" because occasionally they loosened, tearing the bail (handle) from the can.

Problems encountered during the war focused more attention on both items.

The military services, bothered by mildew and rotting of supplies and equipment in the tropics, discovered mercury did the trick in inhibiting mildew. But mercury was a critical metal and unavailable to the civilian paint market. It wasn't until the early 1950's that Moore and other paint companies really began "hitting" the market with mildewcides containing mercury.

With tin also being in short supply during the War, can makers had to use black plate for paint cans. Soldered ears did not satisfactorily adhere to the black plate, so for most of the Second World War and Korean conflict, consumers had to be content with black plate cans without handles.

This latter problem prompted American Can Company to search for a better means of attaching ears to paint cans; a means of making the container "carry-safe," eliminating flux marks on the outside of the container, and guaranteeing the paint industry a can with a handle, even during times of national emergency.

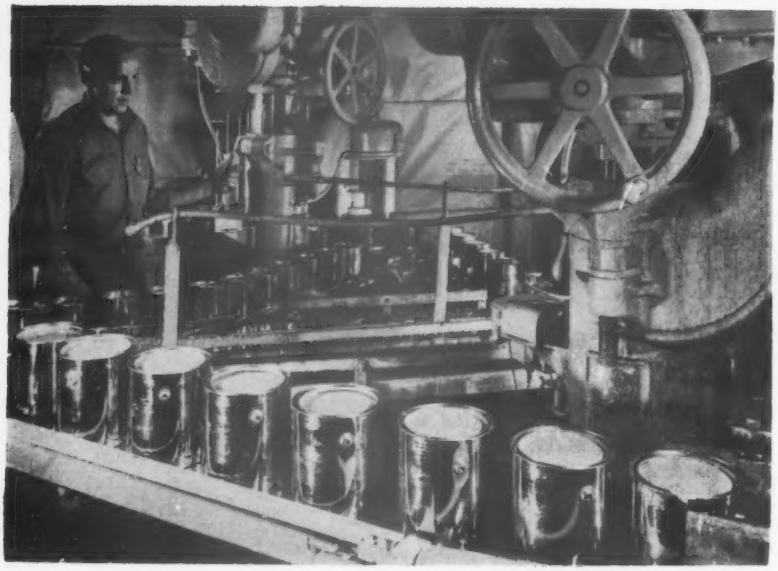
While Canco's research was going on, Moore was marketing products containing mildewcides and finding considerable trouble with the adherence of ears to the can. Complaints from retailers and consumers that the handles were coming loose from the cans showed a marked increase following the introduction of mercurial mildewcides.

Mercury Vapor-The Culprit

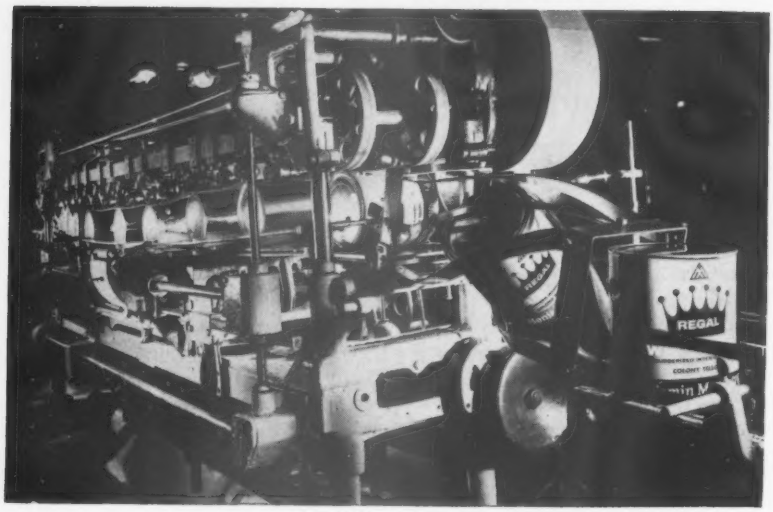
"Our research department discovered that the problem stemmed from vapor escaping from the mercury amalgamating with the solder, thus liquefying the solder and permitting the ears to loosen and fall off the cans," Mr. Jamison said.

"This chemical reaction had no effect on the paint itself, but resulted in ears falling off or being weakened to the extent that they were pulled off when the can was lifted by the bail. This generally happened about four months after the cans were packed," Mr. Jamison said.

He pointed out that four months is a remarkably short life for a can of paint, and that though a can usually moves off the shelf within



Gallon can being filled at Benjamin Moore's plant.



Filled and sealed cans being labeled.

six months, much paint remains with the retailer for as much as a year before being purchased.

Benjamin Moore & Co. went to Canco with the problem, learned that the can company was working on the development of a clinched ear paint can and shortly thereafter began using the new package to eliminate the problem.

Under the new method of attachment, the ears are clinched into the body of the can by a process of "bumping" a body fold over the ear flange. It means that the ear actually is imbedded in the body and that no solder is used. A terrific force is required to actually tear the ear from the can body.

Canco claims its clinched ear cans are carry-safe and provide the paint industry and the consumer with the most accident-proof handling ever achieved in paint can manufacture.

"Development of the clinched-ear can couldn't have come at a better time for us," said Mr. Jamison. "It gave us a comparatively easy answer to our problem and eliminated the need for costly research that otherwise might have been necessary to either reformulate the product or find more suitable means for attaching the ears to the cans," he said.

He added that "the clinched ear has eliminated the problem for us. We no longer have retailer or consumer complaints about handles coming off paint cans."

May 22-23. Annual Symposium of the Pacific Northwest Paint & Varnish Production Club, Multnomah Hotel, Portland, Ore.

June 5-6. Annual joint meeting of the Kansas City and St. Louis Paint & Varnish Production Clubs, Phillips Hotel, Kansas City.

June 21-26. ASTM Spring Meeting, Chalfonte-Haddon Hall, Atlantic City.

PRODUCTION CLUB MEETING

Baltimore, 2nd Friday, Park Plaza Hotel.
Chicago, 1st Monday, Furniture Mart.
C.D.I.C., 2nd Monday.
Cincinnati — Oct., Dec., Mar., May, Hotel Alms.
Dayton — Nov., Feb., April Suttmilers.
Columbus — Jan., June, Sept., Fort Hayes Hotel.
Cleveland, 3rd Friday, Cleveland Engineering & Scientific Center.
Dallas, 1st Thursday after 2nd Monday, Melrose Hotel.
Detroit, 4th Tuesday, Rackham Building.
Golden Gate, 3rd Monday, Sabella's Restaurant, San Francisco.
Houston, Monday prior 2nd Tuesday, Rams Club.
Kansas City, 2nd Thursday, Pickwick Hotel.
Los Angeles, 2nd Wednesday, Scully's Cafe.
Louisville, 3rd Wednesday, Seelbach Hotel.
Montreal, 1st Wednesday, Queen's Hotel.
New England, 3rd Thursday, University Club, Boston.
New York, 1st Thursday, Brass Rail, 100 Park Ave.
Northwestern, 1st Friday, St. Paul Town and Country Club.
Pacific Northwest, 3rd Thursday, Washington Athletic Club, Seattle, Wash.
Philadelphia, 3rd Wednesday, Philadelphia Rifle Club.
Pittsburgh, 1st Monday, Gateway Plaza, Bldg. 2.
Rocky Mountain, 2nd Monday, Republican Club, Denver, Colo.
St. Louis, 3rd Tuesday, Kings-Way Hotel.
Southern, Annual Meetings Only.
Toronto, 3rd Monday, Oak Room, Union Station.
Western New York, 1st Monday, 40-8 Club, Buffalo.

Widely Recognized as a Standard of the Industry!

Sovasol 35 is an isoparaffinic solvent that is practically odorless, water-white in color, doctor sweet, and extremely color stable. It comes to you spotlessly clean in tank cars. These qualities have made Sovasol 35 a standard of the paint industry.

For further information about Sovasol 35 and Mobil's complete line of quality aliphatics, call your Mobil representative, or write to address below.

MOBIL OIL COMPANY
A Division of Socony Mobil Oil Company, Inc.
150 East 42nd Street, New York 17, N. Y.

Mobil

NOW THE GREATEST LINE IN FILLING MACHINE HISTORY BEARS A GREAT NEW NAME

Arthur Colton Company has purchased the 50-year-old Hope Machine Company, thus offering a total of 125 years of filling machine experience and the only *complete* line of filling equipment for the pharmaceutical, food products, paint, chemical, petroleum, cosmetics and dairy products industries.

Now, for fast, accurate, large volume fills of liquid, viscous and semi-solid products, the Colton-Hope piston-type fillers round out our complete range, including the most widely accepted equipment for aerosol container and tube filling, tableting and capsulating.

All Colton-Hope machines will be engineered and manufactured in the Michigan plants of Arthur Colton Company. The combined facilities and experience of the two great pioneers will further expand the special applications and engineering services always provided by both companies. Sales and service will be handled by an augmented Colton staff.

This important acquisition is the fourth by the Arthur Colton Company since it became a division of Snyder Corporation in 1949, all aimed at developing and marketing better high speed machinery for the packaging and pharmaceutical fields.

ARTHUR COLTON COMPANY

DIVISION OF SNYDER CORPORATION

3442 E. LAFAYETTE • DETROIT 7, MICHIGAN

PLANT NO. 2—1030 McDOUGALL, DETROIT • PLANT NO. 3—MANCELONA, MICHIGAN

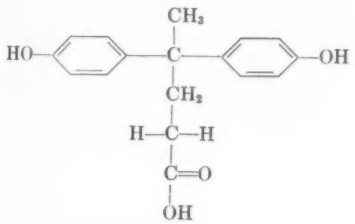
Sales and Service Engineers Coast-to-Coast • Export Office—13 E. 40th St., New York City • Offices in Principal Cities Throughout the World

Specialists in Drug, Chemical and Filling Machinery for 75 Years

New Developments

S. C. Johnson Introduces New Coating Intermediate

S. C. Johnson & Son, Inc., Racine, Wisc., has developed Diphenolic Acid, a 4,4-Bis(4-hydroxyphenyl) pentanoic acid.



Diphenolic Acid has a molecular weight of 286.31. The following physical properties have been established: Appearance — light tan granules; Odor — slightly phenolic; Melting point — 167-172°C; Acid number — 190-196; Purity — minimum 97%.

DPA in Chemically Resistant Coatings

DPA mixed ester condensation products offer the possibility of combining chemically in the same molecular structure a high degree of formaldehyde reactivity with the added benefit of internal plasticization. This permits formulation of chemically resistant films having good flexibility, a combination which has been heretofore difficult to achieve.

For example, a theoretical formula of a mixed ester might contain three mols of Diphenolic Acid, one mol of fatty acid, and one mol of pentaerythritol.

Considering the number of possible variables such as different raw materials, stoichiometry, catalysts, and baking schedules, it becomes apparent that there are a large variety of potential coatings of this type.

The general procedure for the preparation of typical DPA high performance coatings is as follows:

1. Coesterification
   a. Fusion process
   b. Xylene azeotrope
2. Formaldehyde Condensation
   a. Alkaline catalyst
   b. Acid catalyst
3. Solvent Reduction
   a. Mixed alcohols
   b. Ketone-alcohol mixtures
   c. Ketone-aromatic-alcohol mixtures

In summation, the formaldehyde condensation products of mixed Diphenolic Acid coesters having built in plasticization should find considerable utility where chemical resistance, adhesion and flexibility are desired, and the film color is not of prime importance.

DPA Coester Air-Drying Finishes

The versatility of DPA in esterification reactions makes it uniquely suited for the preparation of a wide variety of synthetic esters, polyhydric phenols and coating materials. For example, it can be reacted with long chain unsaturated alcohols and acids, natural and synthetic resin alcohols and acids, and polyhydric alcohols to form interesting and useful products.

Another important reaction is the ability of Diphenolic Acid to self-esterify, merely by the application of heat with or without catalyst, to form resinous intermediate materials of varying acid value. When combined with fatty acids and polyhydric alcohols, coesters are formed having properties dependent on the stoichiometry employed. These compositions contribute plasticizing action and unsaturation for air-dry conversion in the case of protective coatings.

Diphenolic Acid can be coesterified with fatty acids and polyhydric alcohols to form air-drying products exhibiting superior film properties. The effect of varying the fatty acid content of these formulations and observations made from film test data are presented in comparison with epoxy resin esters and an oleoresinous varnish composition.

The basic reactions involved in the preparation of DPA coester air-drying finishes are:

1. Acetylation of Diphenolic Acid with acetic anhydride
2. Ester interchange with fatty acid
3. Esterification of polyhydric alcohol to low acid value
4. Cut with suitable solvent system, cool and add driers

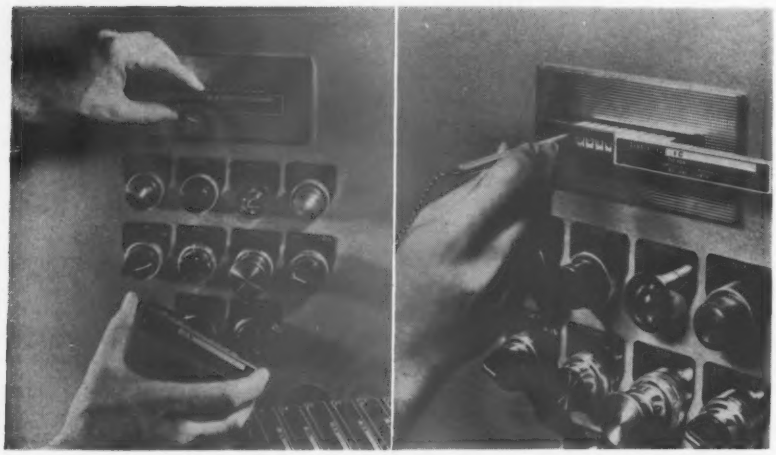
Several DPA coester air-drying finishes of varying fatty acid content have been prepared and their properties determined. These formulations have also been compared with epoxy esters of comparable fatty acid content and an oleoresinous varnish from the standpoint of solubility characteristics, shelf life, dry time, hardness, chemical resistance, etc. Improved properties of Diphenolic Acid coester air-drying finishes over the epoxy ester and oleoresinous type finishes are:

1. Faster set and tack-free drying time
2. Excellent film hardness and durability
3. Significant improvement in cold and boiling water resistance
4. Improvement in film color

•

New Batching Device Introduced by Howe

A new development in the design and construction of automatic-



Left: Batchplug provides instant formula change-over, controls up to 10 separate ingredients on 3 scales. Right: Each of 10 ingredients controlled by a Batchplug can be adjusted for larger or smaller quantities by a simple adjustment of a single screw. Accuracies can be held to within 1 scale graduation up to .1%.

batching equipment has been announced by The Howe Scale Co.

Incorporating a new formula control component called the Howe Batchplug, the new system provides instant formula changing while completely eliminating any human error sometimes present in manual ingredient dialing systems.

Each standard Batchplug is a self-contained formula, which provides complete preset control for up to ten ingredients per formula. The Batchplug itself is about the size of a pack of cigarettes, ruggedly constructed for heavy industrial use. Each Batchplug has an individual nameplate for quick identification. A convenient rack is available for holding several Batchplugs where a plant uses a number of different formulas for its normal production activities.

A small screw driver is the only tool required to set the Batchplug for proper control over any batching operation. Individual Batchplugs can be accurately sealed within one scale graduation to provide absolute compliance with all local, state or federal batching regulations. Formula privacy can also be indefinitely retained. No special operator skill is required to adjust or operate the Batchplug and the new batching control system.

Because the Batchplug greatly simplifies electric circuitry and reduces control cabinet size, it provides substantial economies which, in many cases, will bring automatic batching within the range of smaller firms. The Batchplug system can be used in the largest or the smallest automatic batching operations. Five basic Batchplug models are now available to control up to ten ingredients with up to three scales.

Complete details including technical literature and specifications are available from The Howe Scale Co., Dept. PVP, Rutland, Vermont

Sherwin-Williams Fluid Polyester Toner Colors

Fluid toner colors for polyester resins, pretested for color uniformity and intensity, have been introduced by the Sherwin-Williams Co. They are primary color bases dispersed in a reactive monomer, and their standardized, low viscosity permits them to be poured into a resin mix with a minimum of effort. Agglomeration and filtering out of pigment, common when color pastes are used, are eliminated with the fluid colors. This insures greater production economy since the number of rejections due to color variance is sharply reduced.

The amount of toner color required is determined by the type of resin mix used. Unfilled laminates require as little as 0.1% to 0.5% of color; formulations containing fillers may require from 1% to 10%. Degree of opacity also governs the quantity of color needed.

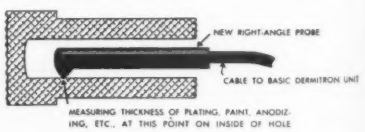
Currently, the following colors are available: black, orange, blue, gray, green, brown, red, turquoise, yellow, and white. These may be intermixed to create a wide variety of shades, and special colors can be made to order. The colors are offered in quart, gallon, and five gallon containers. They may also be supplied in pre-packaged measured amounts to eliminate weighing operations if desired. Complete details on the new fluid toner colors are available from: General Industrial Division, Dept. PVP, The Sherwin-Williams Co., Cleveland 1, Ohio.

•

Unit Process Develops Coating Thickness Tester

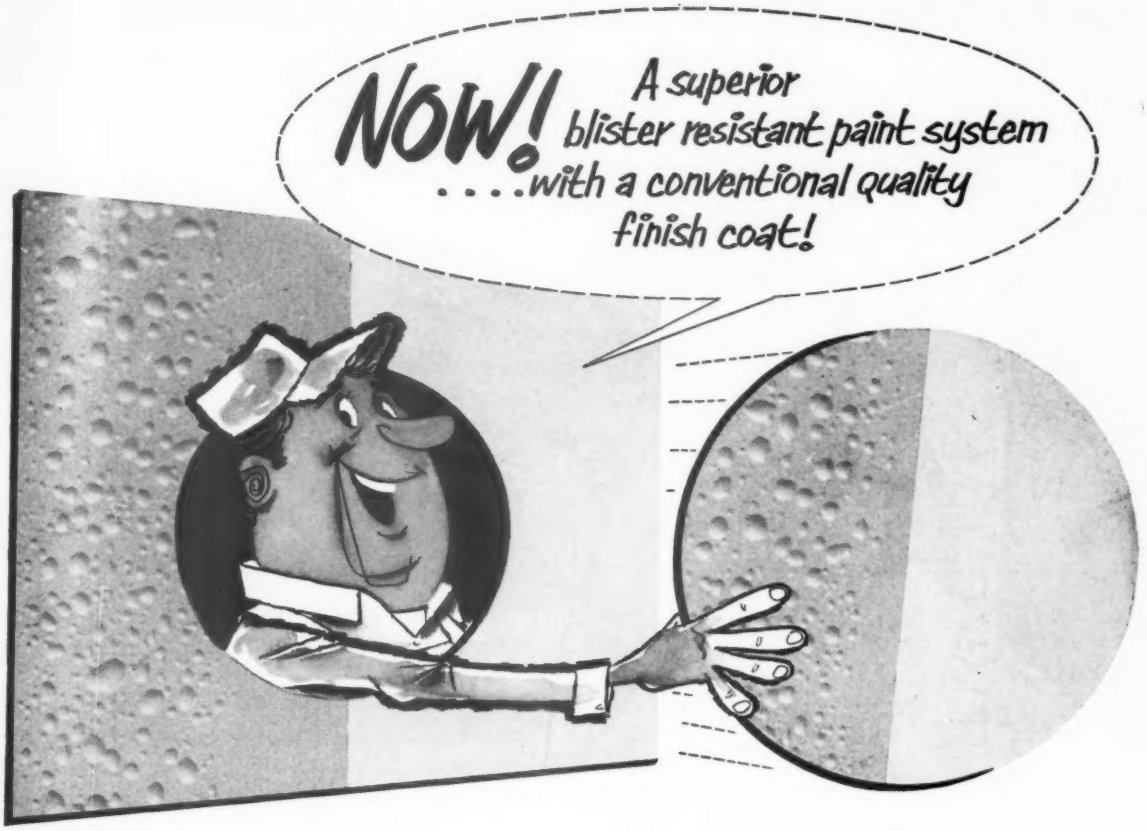
A new non-destructive coating thickness tester, Dermitron Model D-2, has been developed by Unit Process Assemblies, Inc.

This portable instrument, for both laboratory and production use, said to give fast, accurate and direct readings of virtually any coating on any base, including: metal coatings (such as plating) on metal base; non-metallic coatings (such as paint, anodizing, porcelain) on metal base; and metal films on non-metallic base (plastics, ceramics).


NEW RIGHT-ANGLE PROBE
CABLE TO BASIC DERMITRON UNIT
MEASURING THICKNESS OF PLATING, PAINT, ANODIZING, ETC., AT THIS POINT ON INSIDE OF HOLE

Dermitron D-2 comes with four measuring probes for extra wide thickness ranges from thin to thick deposits, and requires only a 1/8th inch circle-area for measurement. The versatile Dermitron can also be used for sorting and matching of metals and alloys.

Complete data on Dermitron D-2 is available from Unit Process Assemblies, Inc., Dept. PVP, 61 East 4th Street, New York, N. Y.



TEST PANEL on right shows that no blistering occurred in the paint system using a primer formulated with Eagle-Picher Super Sublimed White Lead—top coated with Federal Specification TT-P-103.

Yours...with EAGLE-PICHER Super Sublimed White Lead!

Accelerated tests prove that blistering *does not occur* when quality house paint primers are formulated with Eagle-Picher Super Sublimed White Lead. Even under adverse moisture conditions, these primers show very little water absorption, low volumetric swelling and superior adhesive characteristics.

Equally important—Eagle-Picher Sublimed White Lead makes your primer an *all-purpose primer* . . . compatible with *any* quality top coat house paint.

Since 1843

EAGLE EP PICHER

EAGLE-PICHER

The Eagle-Picher Company • Cincinnati 1, Ohio

Regional sales offices: Atlanta, Chicago, Cleveland, Dallas, New York, Philadelphia, Pittsburgh

West Coast sales agent: THE BUNKER HILL COMPANY, Chemical Products Division
Seattle • Portland • Oakland • San Francisco • Los Angeles • Kellogg, Idaho

From the **HIGHEST** to the **LOWEST**

OTHER GRADES OF AZO ZINC OXIDES IN A WIDE RANGE OF OIL ABSORPTIONS

Where necessary to meet your requirements we can select within grades the *exact* degree of desired oil absorption.

NOTE: AZO paint grade zinc oxides available as AZODOX (de-aerated). AZODOX has twice the apparent density, half the dry bulk of conventional oxides.

1ST

American Zinc was the first, *and is still the only* producer of acicular lead-free zinc oxides covering a wide range of oil absorptions from high to low *and including the intermediate ranges.*

For Example:

When high consistency is wanted, use . . .

AZO ZZZ-22

This is the original high oil absorption acicular zinc oxide. The unusual weathering properties imparted to paints by AZO acicular type zinc oxides are present to the highest degree in AZO ZZZ-22.

When very low consistency is wanted, use . . .

AZO ZZZ-55 or AZO ZZZ-55-LO

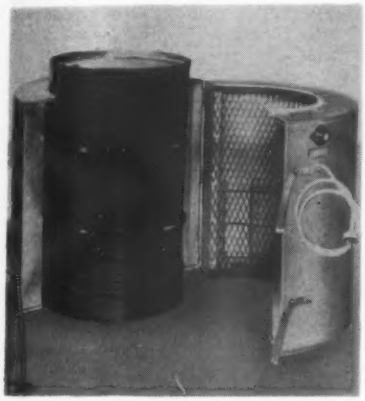
Highly recommended for general paint formulations where very low oil absorption zinc oxide is desired. Absence of colloidal fines assures good weathering characteristics. Round particle shape.

American Zinc sales company

Distributors for AMERICAN ZINC, LEAD & SMELTING COMPANY
COLUMBUS, OHIO • CHICAGO • ST. LOUIS • NEW YORK

NEW EQUIPMENT AND MATERIALS

This section is intended to keep our readers informed of new materials and equipment. While every effort is made to include only reputable products, their presence here does not constitute an official endorsement.



PALMER

DRUM WARMER
Thermostatically Controlled

Over 100 standard combinations of sizes and models of automatic drum warmers to keep drums at proper temperature automatically has been made available. Customer can specify the model which fits his power supply, his temperature requirements and his processing methods.

Each warmer is a complete unit, thermostatically controlled, fiber glass insulated, and electrically grounded.

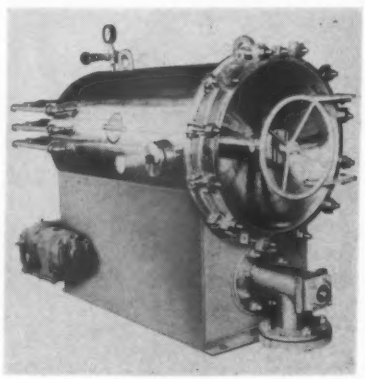
Designed for hard usage in industrial processing, yet engineered to eliminate any possibility of hot spots, it can safely be used for all viscous materials such as tar, asphalt, etc., or the most sensitive materials.

Harold L. Palmer Co., Dept. 154-PVP, 28625 Grand River Ave., Farmington, Mich.

FILTER
Pressure Type

A new type diatomite filter that combines the cake stability of a horizontal plate with dry cake automatic discharge has been made available.

This filter, known as the Model HR, is a totally enclosed pressure type that can be cleaned with complete cake removal without opening the filter. The plates are precoated and operate in a horizontal position; this assures cake stability without danger of cracking or slipping. Individual plate shut-off valve and sight glasses make it possible to blow the cake completely dry even with a limited supply of air or gas. The plates are then mechanically rotated to a vertical position, and a tapping on the external agitator bar will knock off the cake, or a vibrator can be used.



SPARKLER

A screw conveyor removes the spent cake as a dry powder. Complete cleaning of the plates is performed without opening the filter. This filter can be furnished to operate completely automatically with electronic controls.

Sparkler Manufacturing Co. Dept. PVP, Mundelein, Ill.

TEMPERATURE BATHS
Maintain ± 0.1°C. Accuracy

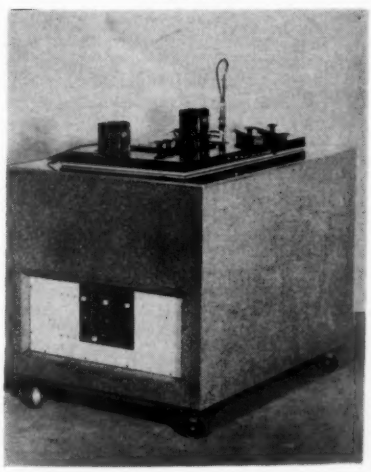
New line of variable temperature baths to test diodes electronic components, thermostats, and other equipment that requires highly accurate testing conditions. These conditions are secured with thermistor controls capable of maintaining temperatures within ±0.1°C. accuracy. The thermistor controls are mechanically unbreakable.

The Produc-temp Baths, as they are called, may be had as individual units each adjustable to 100°C., 25°C., or −55°C.; or as a combination bath with a temperature range from 100°C. to −55°C. The variable temperature bath is controlled by ten separate thermistor controls, so that complete programming of temperature changes is achieved. Silicone fluid, No. 200, because of its chemical inertness, heat resistant properties and uniform viscosity, is the recommended liquid.

All units have stainless steel interiors, cold-rolled steel exteriors and recessed control panels. Units are fitted with 2-1/30th H.P. circulators; overall dimensions are 46″ long, 36″ wide and 38″ high. Combination units are agitated with motors of 1 H.P., and have a circulation of 150 gallons a minute.

Full information and prices are available from Labline, Inc., Dept. PVP, 3070-82 W. Grand Avenue, Chicago 22, Ill.

LABLINE



NEW MATERIALS — EQUIPMENT

JAR
Alumina-Reinforced Body

A new type of jar with an alumina-reinforced ceramic body is said to have exceptionally high strength and a dense body. In impact and abrasion laboratory tests these new jars have outlasted regular porcelain jars 3 to 1.

Flat gaskets are employed which seat on flat ground surfaces in both jar and cover.

Metal handles, cemented on the covers, have built-in finger holds which make it easy to lift the loaded jar, to remove the cover, or break the cover seal. These handles also distribute across the entire cover the pressure of the crossbar set screw, thus affording added protection against cover breakage.

Form fitting steel neckbands evenly distribute tightening pressure and so reduce the hazard of cracking the neck when the cover is tightened.

A separate crossbar facilitates cleaning the cover. Adjustment has been made easier; a large handwheel, in place of the thumb nut, enables the operator to apply enough pressure to seal the cover. There is no need to use a wrench or pliers.

These jars are available in sizes from 5 quarts up to 57 gallons.

Paul O. Abbé, Inc., Dept. PVP, 405 Center Ave., Little Falls, N. J.

PAUL O. ABBÉ

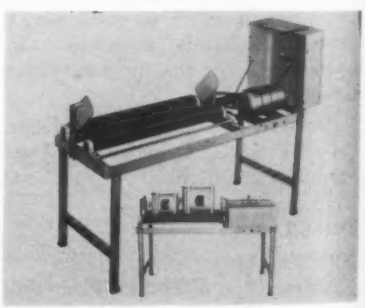
ROLLER MILL
For 1-Pint to 5-Gallon Jars

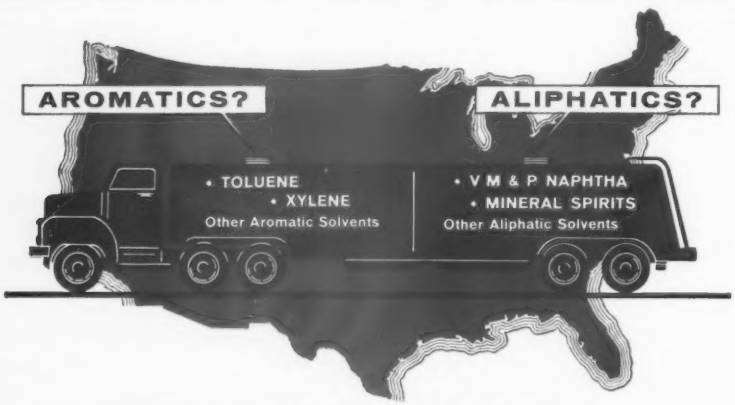
New type of laboratory roller mills recently introduced.

The new laboratory roller mill boasts neoprene-covered steel rolls that resist chemical and abrasive action and can be moved in or out to accommodate one-pint to five-gallon jars. This is done without bolts or nuts. One roll is a power roll, the other an idler roll. The idler roll is picked up by its frame on one side and slid into position for a desired jar size and held there securely by steel pegs which insert into pre-spaced holes in the mill's frame. There are no bolts to loosen. . .no nuts to tighten. The entire operation takes but a few seconds.

Another feature of the new roller mill is the variable pitch drive which allows smoother starts and stops and adjustment for numerous roll speeds. Roller bearings are

MC DANEL





Now! Big Savings with

ESPESOL SOLVENTS'

ONE-SOURCE SUPPLY

Save on Freight Costs Smaller, multi-product orders are shipped in compartment lots by tank car, transport truck, barge, and ship and enjoy bulk rates.

Reduce Inventory Costs Less capital tied up in inventory because stock on hand is kept to minimum. Losses from evaporation and other causes greatly reduced. Fresh stock insured at all times.

Immediate Availability Eastern States' conveniently located terminals insure quick delivery to all points.

"Package" Delivery Ideal for Small Buyers Combining small lots into one shipment reduces purchasing agent's work, simplifies unloading and handling, and insures all products arriving at one time to minimize production delays.

Eastern States Petroleum & Chemical Corporation

Eastern States Petroleum and Chemical Corporation
P. O. Box 5008
Houston 12, Texas
Please send additional information on Espesol's ONE SOURCE supply! PVP-559
Name_____
Title_____
Company_____
Address_____
City_____ Zone____ State____

Post Office Box 5008—Houston 12, Texas—Phone WAlnut 3-1651
Chicago Office: 1011 Lake St., Oak Park, Illinois, Phone Village 8-5410
New York Office: 10 Rockefeller Plaza, New York, Phone Circle 7-2520
Cleveland Office: 20800 Center Ridge Rd., Cleveland, Ohio, Phone EDison 3-0188
Louisville Office: 4th and Broadway St., Louisville, Ky., Phone JUniper 3-7634
Atlanta Office: 3121 Maple Drive, N.E., Phone CEdar 3-3227
Los Angeles Office: 110 S. Euclid, Pasadena, Phone RYan 1-0278

U. S. Terminals:
Houston, Texas • Chicago, Illinois • East Liverpool, Ohio
Madison, Indiana • Brownsville, Texas • Savannah, Georgia
Carteret, New Jersey • Los Angeles, California

NEW MATERIALS — EQUIPMENT

permanently lubricated and do not need attention.

The mill is driven by a 1/3 HP, 115 volt, single phase, 60 cycle, motor-gear reducer power unit. An eight-ft. long, heavy-duty, rubber-covered cord is provided. Power unit and V-belt drive are covered completely by a specially designed hood which affords protection.

McDanel Refractory Porcelain Co., Dept. PVP, P.O. Box 560, Beaver Falls, Pa.

PRECISION GAGE

WET FILM APPLICATOR
17 Different Path Depths

An eight-path wet film applicator is now available in nine different models having a total of 17 different path depths and three different path widths.

Ranges covered by the nine models are: .0005″, .001″, .0015″, .002″, .003″, .004″, .005″, .006″, .007″, .008″, .010″, .015″, .020″, .025″, .031″, .040″, and .050″. These instruments said to be accurate to 1/10,000 of an inch and are used in conjunction with hiding power charts, plate glass, or on any other plane surface, to determine hiding power of paints, enamels, lacquers, technical coatings, and other materials which require such determination.

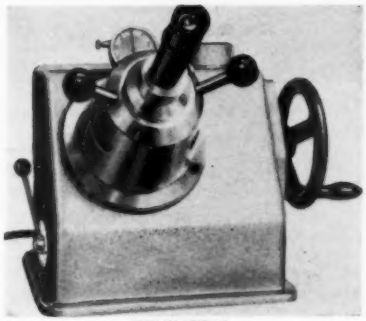
The depths of paths are fixed, i.e., they are calibrated in the actual depths. This feature affords a true reading of film thicknesses of all films since materials will vary in shrinkage according to their thixotropic properties and/or rheological qualities.

Precision Gage & Tool Co., Dept. PVP, 320 E. Third St., Dayton 2, Ohio.

TESTING MACHINE
For Lacquer & Paint

New machine is a specially designed manual-hydraulically driven lacquer and paint testing machine to enable the user to carry out the Erichsen Cupping Test. The test result is observed visually, either directly or with the help of a microscope with built-in lighting.

Specimens up to one mm thick can be drawn on Model 229 by easy turning of the handwheel with the operator sitting in front of the machine. The specimen, and also the depth indicating dial gauge, can be observed directly from this sitting position. By moving the control lever on the lefthand side, the punch immediately returns to the



ERICHSEN

the starting position. Quick and exact tests are said to be obtained.

A. M. Erichsen GMBH, Hemer-Sundwig/Westf., Germany. Representative: Richard Schachne, Dept. PVP, 545 Fifth Ave., New York 17, N. Y.

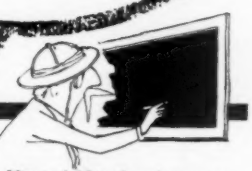
NAFTONE

Additives for Paint Formulations

CLEARATE WD
Water dispersible soya lecithin for aqueous pigmented dispersion. Gives good initial pigment dispersion, eliminates flocculation, inhibits hard settling of the pigment on storage

ANTI-SKINNING AGENTS:
NILSKIN —Highly volatile anti-skinning agent—will not affect dry when several times effective dosage is used.
NILSKIN No.2 —Non-volatile, non-toxic anti-skinning agent—will not produce discoloration in presence of cobalt driers.

UNAPEX —A complete base for the manufacture of butadiene styrene or acrylic latex paints, making faster and easier production.
UNAPEX P —A complete base for the manufacture of polyvinyl acetate paints, reduces production to four ingredients.



NILDEWS:
NILDEW OL —28% and 30% phenyl mercury oleate for proven protection in oil systems.
NILDEW AC —10% and 30% phenyl mercury acetate for most effective protection in latex paint systems.

SUPER COBALT 5%
For use with drying oil or alkyd resin modified latex emulsion. Gives better initial dry and offsets loss of scrub resistance on aging of modified latex paints.

NAFTONE INC.
425 PARK AVE., NEW YORK 22, N. Y.

NEW MATERIALS — EQUIPMENT

DICARBOXYLIC ANHYDRIDE
For Epoxy Curing

Beta-S, a new liquid dicarboxylic anhydride has been introduced in development quantities.

Testing shows the product to be particularly useful in curing epoxy resins. Beta-S, dimethyl substituted butenyl tetrahydro phthalic anhydride has a combination of double bond and anhydride functionality indicating potential as an intermediate for preparing surfactants, lubricant additives, corrosion inhibitors, dyes, fungicides and inks.

As a curing agent, Beta-S is claimed to be suitable for systems used in impregnating, potting, casting, laminating, tooling and coatings. Physical testing shows epoxy systems cured with the anhydride to possess high compressive and flexural strengths, low power factor characteristics and low shrinkage. Low exotherm evidenced by the anhydride in casting operations is conducive to plant safety.

The low density offered by Beta-S cured epoxies, 10% lower than comparable systems, is expected to promote material economy in potting and casting.

The chemistry of Beta-S suggests its use as a valuable intermediate. Readily reactive, the product will undergo hydrolysis, esterification, amidation, imide formulation, reduction, aromatization and oxidation.

Market Development Department, Heyden Newport Chemical Corp., Dept. PVP, 342 Madison Avenue. New York 17, N. Y.

PHTHALOCYANINE GREEN
New Type

Heliogen Viridine Y is said to be the first major expansion of the phthalocyanine spectrum since its introduction more than 20 years ago.

The new product is claimed to be the yellowest green pigment available for producing vivid, light-fast colors free of the dichromatic effect often exhibited by mixtures of yellow and green pigments.

It has high-tinting power and is stable to organic solvents, acids and alkalies. It is available in many forms, including toners, lakes, dispersed powders, water dispersions, pastes and presscakes, so as to serve the needs of many industries.

General Aniline & Film Corp., c/o Fuller, Miele, Inc., Dept. PVP, 247 Park Ave., New York 17, N. Y.

RESIN
For Multicolor Paints

New resin, called 1100 TMV, said to offer numerous advantages for multicolor paints—as well as for colored aluminum and one-color coatings.

1100 TMV requires only lower-priced petroleum solvents and has a low odor level.

Additionally, multicolor paints made with 1100 TMV are claimed to be non-penetrating, washable, easily applied to any rough or smooth paintable surface. They do not require a special undercoat and are resistant to alkalies, mild chemicals, salt water, abrasion, fumes and mildew.

Other features include outstanding stability in conventional cans and glass containers with no skinning and minimum settling. Because of the resin, thick-coat applications can be made without streaking or lap marks. Further, the vehicle's antistatic properties insure a multicolor paint with the advantage of less-dirt adherence.

Marbon Chemical Division, Borg-Warner, Dept. PVP, Box 68, Washington, W. Va.

REDUCE INVENTORIES
WITH THE NEW
Kodis
TRADEMARK COLORS
UNIVERSAL CONCENTRATES

Compatible with both Oil and Water Systems!

IMPORTANT ADVANTAGES

● High concentration — 50% solids or better ● Excellent compatibility and maximum dispersibility in gloss and semi-gloss enamels ● Easily incorporated in alkyd flats ● Excellent working properties in latex emulsion paints; Styrene Butadine, Polyvinyl Acetate and Acrylic ● Excellent alkali & light resistance ● Excellent stability ● Finely dispersed to eliminate grinding ● Readily admixable to give a variety of shades ● Non-drying and non-settling on long standing ● Freeze-thaw stability

Avail yourself of the facilities of our sales service laboratory on all your color problems. Brochures and samples will be sent on request.

Experts in Color Technology for More Than a Century
H. KOHNSTAMM & CO. Inc.
89 Park Place, New York 7 11-13 Illinois Street, Chicago 11
2632 East 54 Street, Huntington Park, California
Branches in other principal cities of the U. S. A. and throughout the world

QUENCH TEST
Sample panel heated 1000°F in muffle furnace, quenched in water. No film rupture.
FLEXIBILITY TEST
Same sample panel heated in muffle furnace cooled, bent over ¼" mandrel. No film rupture.
FLAME TEST
Panel coated with X-37 and silicone based aluminum paint. Heat cured. Subjected to flame test. No film rupture.
new way to beat the heat

VELSICOL X-37 HYDROCARBON RESIN

. . . *extends silicones in heat resistant aluminum paints!*

This flame test, and the other tests shown, prove that Velsicol's new X-37 resin can be used with silicones to produce aluminum paints with a high degree of heat resistance. By using X-37 to extend silicones, you can substantially reduce raw materials costs. X-37 comes solid or flaked, and is available in commercial quantities. Get all the facts about X-37 now, without cost or obligation.

MAIL THIS COUPON TODAY FOR COMPLETE TECHNICAL INFORMATION AND TEST SAMPLE!

LOOK FOR THIS MAN

. . . your Velsicol representative, who can help you make better products for less!

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CHEMICAL CORPORATION

330 E. Grand Avenue, Chicago 11, Ill.

International Representative: Velsicol International Corporation, C.A. • P. O. Box 1687 • Nassau, Bahamas, B.W.I.

VELSICOL CHEMICAL CORPORATION

330 East Grand Avenue, Chicago 11, Illinois PVP-59

- ☐ Please send a sample of Velsicol X-37 Hydrocarbon Resins.
- ☐ Please have a salesman call.
- ☐ Please send technical literature.

Name_____

Company_____

Address_____

City_____ Zone____ State_____

PATENTS

Complete copies of any patents or trade-mark registration reported below may be obtained by sending 50c for each copy desired (to foreign countries $1.00 per copy) to the publisher.

Cementiferous Paints

U. S. Patents 2,874,057. John Edwin Oakley Mayne, Cambridge, England, assignor to The British Iron and Steel Research Association, London, England, a British company.

A cementiferous paint for the protection of ferrous metal surfaces consisting essentially of a mixture of zinc dust and an aqueous solution containing at least about 20% of an alkali metal phosphate of the group consisting of, monopotassium dihydrogen phosphate, dipotassium hydrogen phosphate, tripotassium phosphate, a mixture of potassium phosphates, and a mixture of a potassium phosphate and a sodium phosphate, said aqueous solution having a pH value within the range from about 8 to about 9.9 and the weight ratio of zinc dust to said alkali metal phosphate being within the range from 1:1 to 25:1.

Coating Compositions

U. S. Patent 2,876,135. Morris Levine, Cleveland Heights, Ohio, assignor to Pittsburgh Plate Glass Co., Allegheny County, Pa., a corporation of Pa.

A coating composition comprising a solvent having dissolved therein from 60 percent to 80 percent by weight of the resinous components, of a short oil alkyd resin having an acid number of about 35 to 50, from 20 percent to 40 percent by weight of the resinous components, of a vinyl resin which comprises a copolymer of a vinyl halide and a vinyl ester of a staurated aliphatic monocarboxylic acid, and from 5 percent to 15 percent by weight of the resinous components, of an amine-aldehyde resinous condensation product.

A method of finishing an automobile body which comprises applying thereto as a base the coating composition of claim 1, permitting said composition to dry in air for from about 1 to 3 minutes, applying a filler composition to said base composition, baking said base composition and filler composition at a temperature of about 200°F. to 350°F., and then applying a finish coating to said baked surface.

Wax Emulsion Polish

U. S. Patent 2,874,137. John Pisanchyn and Harvey A. Troutman, Morristown, N. J., assignors to Allied Chemical Corp., a corporation of New York.

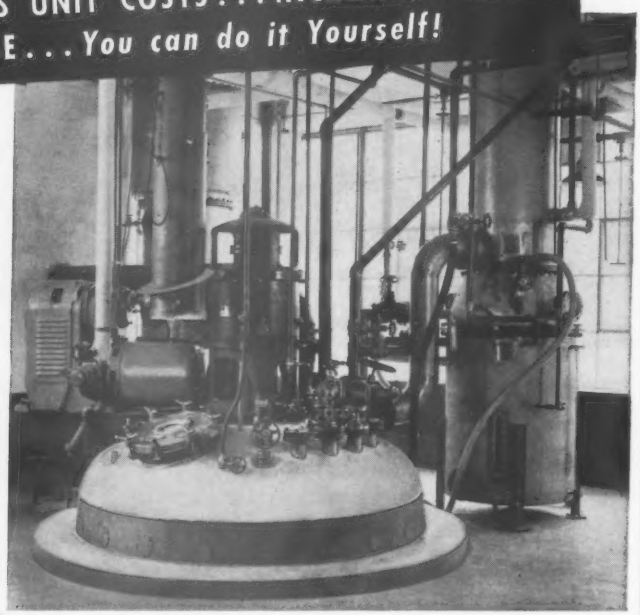
A wax polish in the form of a stable aqueous dispersion containing 8 to 20 parts total solids per 100 parts by weight of dispersion, said total solids comprising essentially 1.6 to 11.0 parts by weight of an emulsifiable oxidized polyethylene wax having a molecular weight of about 1,000 to about 5,000, an oxygen content between about 1% and 17%, a hardness equal to a penetration not more than 1.5 mm. as measured by standard ASTM method D-5-25, a toughness equal to at least 2 foot pounds per linear inch as measured by standard ASTM method D-256-47T, and a low ratio of saponification number to acid number; 1.6 to 11.0 parts by weight of a polystyrene resin having a molecular weight above 5,000, and 1.6 to 9.0 parts by weight of an alkali-soluble material selected from the group consisting of rosin, shellac, casein, phenol-formaldehyde resins, condensation products of reactants comprising maleic anhydride and rosin and condensation products of reactants comprising fumaric acid and rosin.

Self-Polishing Aqueous Emulsions

U. S. Patent 2,874,061. Helmut Kolling, Duisburg-Hamborn, and Friedrich Rappen, Oberhausen-Sterkrade, Germany, assignors to Ruhrchemie Aktiengesellschaft, Oberhausen-Holten, Germany.

A wax suitable for the production of self-polishing aqueous emulsions consisting essentially of a mixture of free wax acids, alkali soaps thereof and paraffin formed by chlorinating a paraffin having a molecular size above about C_{30} with the addition of 1.5-4 grams atoms of chlorine per mol of hydrocarbon, dehydrochlorinating the chlorinated product to form olefins, converting the ole-

BRIGHTON QUALITY CONTROL EQUIPMENT
LOWERS UNIT COSTS . . . INCREASES PROFITS
BECAUSE . . . You can do it Yourself!



Wherever Brighton synthetic Resin Kettle Reactor has been installed, lower costs per gallon in the production of synthetic resins have justified the modernization of plant facilities. Operational charts indicate less cooking time, clearer alkyds, better quality, uniform viscosity. Because Brighton's synthetic Resin Kettle Reactor, adaptable to Solvent or Fusion cooking is automatic, you can better control your production and inventory.

Write for complete information on "Synthetic Resins, How To Do It Yourself."

* Recent installation, Automatic Radiant Gas Fired Resin Kettle with solvent reflux Condensor and Decanter.

BRIGHTON
METALSMITHS EST. 1914
CORPORATION
820 STATE AVENUE · CINCINNATI 4, OHIO

fins to aldehydes by the oxosynthesis, hydrogenating the aldehydes to alcohols, forming wax acids from the alcohols by treatment with molten alkali, and saponifying 20-80% of the wax acid with a member selected from the group consisting of potassium hydroxide, sodium hydroxide, potassium carbonate and sodium carbonate.

Thermoplastic Coating Material

U. S. Patent 2,872,347. Marc Goland, New York, Lew Goland, Malverne, and Isidor M. Bernstein, Brooklyn, N. Y., assignors to Printon Corp., New York, N. Y., a corporation of New York.

A coated base material, said base material being selected from the group consisting of polyvinylidene chloride and copolymers of vinylidene chloride with a lesser amount of other unsaturated compounds, said base material being permeable to tetrahydrofuran, said base material having a non-blocking and moisture-resistant coating film of a vinylidene chloride-acrylonitrile copolymer, the composition of said coating film being different from the composition of said base material, abutting layers of said coating film being heat-sealable to each other to form a non-peeling joint at a temperature below the fusion point of said base material.

Resinous Coating

U. S. Patent 2,873,200. Sylvan O. Greenlee, Racine, Wis., assignor to S. C. Johnson & Son, Inc., Racine, Wis.

A coating composition comprising paint and varnish resins dissolved in an organic solvent therefor, characterized by improved water repellency and mar abrasion resistance and having dissolved therein 0.5 to about 10% by weight, based on the coating resin content, of a synthetic wax compatible with said resin, said synthetic wax being a diester of a dihydroxy phenol having no more than two aromatic nuclei and only the elements carbon, hydrogen, oxygen, and halogen and a straight chain saturated aliphatic monocarboxylic acid of 16 to 30 carbon atoms.

Emulsion Coating

U. S. Patent 2,873,199. John F. McKay, Cranford, N. J., assignor to Esso Research and Engineering Co., a corporation of Delaware.

The preparation of a synthetic latex from a polymeric mass obtained by the polymerization of a conjugated diolefin of 4 to 6 carbon atoms which comprises treating said polymeric mass with oxygen at a temperature between 20° and 250°C. in the presence of a hydrocarbon solvent and emulsifying a solution of said oxidized polymer in the same solvent in which it was treated with oxygen by agitating it with water in the presence of a mixture of sodium lauryl sulfate and a polyether alkylated phenol emulsifier having the formula $R(OCH_2CH_2)_nOH$ where R is chosen from the group consisting of $C_8H_{15}.C_6H_4$— and $C_9H_{17}.C_6H_4$—, and n associated with $C_8H_{15}.C_6H_4$— is chosen from the group consisting of 5 and 8 to 10, and n associated with $C_6H_{17}.C_6H_4$— is 4.

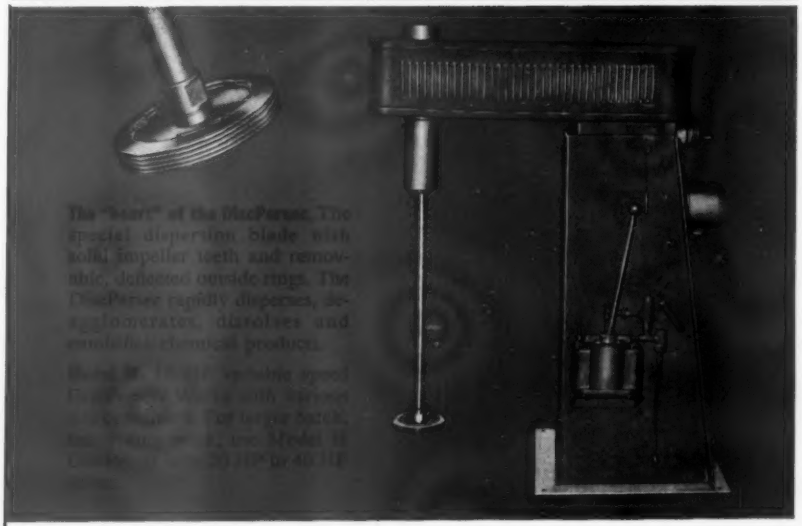
Phenol-Aldehyde Resins Esterified With Fatty Acids

U. S. Patent 2,878,199. Robert A. Mohr, St. Paul, Minn., and Erwin L. Capener, China Lake, Calif., assignors to General Mills, Inc., a corporation of Delaware.

Process of producing a higher fatty acid ester of a phenolic resin which comprises reacting a phenol selected from the group consisting of phenyl phenols and alkyl phenols containing from 1-8 carbon atoms in the alky substituent, and formaldehyde in about equimolar proportions and in the presence of a higher fatty acid in the presence of an acid resinification catalyst and at a temperature below 200°C. to produce a phenolic resin and subsequently heating the phenolic resin thus obtained with the higher fatty acid present during the resinification reaction to a temperature above 200°C. to effect esterification of the phenolic resin.

Correction

In the March, 1959 *Review and Buyers' Guide* issue, page 189 (Directory of Sales Agents and Distributors), the Abbé Engineering Company was listed in error. This should be changed to Paul O. Abbé, Inc. The sales agents for Paul O. Abbé, Inc., as listed, are correct.



NOW! A finished dispersion in a single operation!

The new HOCKMEYER DiscPerser . . . produces very rapid ultimate dispersion...handles high-viscosity materials!

The DiscPerser's special blade operates at peripheral speeds in excess of 6000 FPM. The solid impeller teeth shred and break up pigment agglomerates. Material is discharged through the slots between the rings, at great speed and under intense hydraulic pressure. Tremendous fluid hammer action is developed by the smashing of material against the surfaces of these deflected outside rings. Material leaves the blade in thin, high-speed jet streams. Impact on the slower moving surrounding material creates further attrition and speeds the breakdown to original pigment particle size.

Versatile, the HOCKMEYER DiscPerser also: ● Cold cuts and dissolves exceptionally fast. ● Tints and lets-down unusually efficiently. ● Pre-mixes heavy bases for mill equipment; greatly increases the milling operation.

TRY IT AT OUR EXPENSE. The HOCKMEYER DiscPerser can increase your production, improve your product, save you money. Try it *free* in your own plant. Write for details and free descriptive folder. *Act now!*

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341 Coster St., New York 59, N. Y.

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For details of how you can try the HOCKMEYER DiscPerser *free* in your plant and for a free, illustrated DiscPerser folder, clip this coupon . . . mail it today! **PVP-59**

*My Name*_____

*Company*_____

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*City*_____ *Zone*____ *State*_____

TECHNICAL Bulletins

PROTECTIVE COATINGS

Elastomers Notebook, No. 86, has been made available by the E. I. Du Pont de Nemours & Co., Inc., Dept. PVP, Wilmington 98, Del.

The *Notebook* features an article on the comparative results of protective coatings developed at the Santee Dam.

Many types of coatings were tested—including oil base paints, metallizing, coal tar mastics, various organic coatings, and neoprene. Of all these, only the neoprene based coating provided adequate protection for any appreciable length of time. All others required maintenance, varying from spot-to-spot touching up to complete repainting within a year.

METAL COATINGS

Vinyl Maintenance Top Coats Over Phenolic Primers, a five-page technical bulletin describing a new phenolic/vinyl system of maintenance coatings for metals, has been released by Union Carbide Plastics Co., Division of Union Carbide Corp., Dept. PVP, 30 E. 42nd St., New York, N. Y.

Described by the company as Coatings Technical Release No. 38, the new bulletin explains how the phenolic/vinyl system eliminates the need for costly surface preparation of sandblasting. Formulation methods and exposure test data of panels coated by the new system are also included.

ESTERS

A new booklet, which outlines the properties and applications of 26 esters, has been published by the Union Carbide Chemicals Co., Division of Union Carbide Corp., Dept. PVP, 30 E. 42nd St., New York, N. Y.

The 48-page publication contains three main sections. The first presents information on esters that are used primarily as solvents, with emphasis on their applications in the formulation of coatings. The second section covers relatively specialized esters such as ethyl formate, ethyl silicate, and tetra 2-ethylhexyl silicate. Some of these esters have solvent properties, but most are better known for other applications (for example, as bonding or gelling agents, components of hydraulic fluids).

The third section provides basic reference data, including 27 graphs and tables which chart, in convenient form, evaporation rates, viscosities of resin solutions, dilution ratios, specific gravities, constant boiling mixtures and other pertinent chemical and physical properties. A detailed bibliography and reference section is included.

The booklet also contains shipping, storage, and handling data.

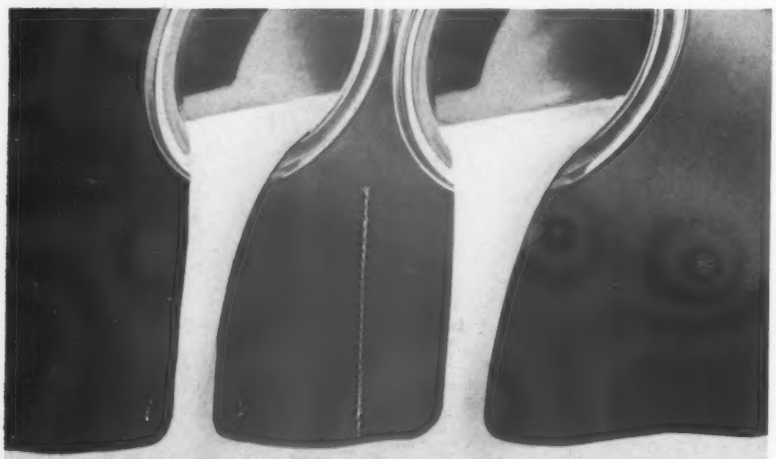
COLORIMETRIC ANALYZERS

Bulletin 1156-1 entitled *Quantichem Automatic Colorimetric Analyzers* has been published by Milton Roy Co., Dept. PVP, 1300 E. Mermaid Lane, Philadelphia 18, Pa.

It describes the industrial instruments available for colorimetric determinations of trace quantities of substances dissolved in liquid process streams.

This bulletin specifically gives details on analyzers for dissolved silica, dissolved oxygen and total water hardness.

Schematic diagrams are included



Which paint has been extended with high-brightness Dicalite?

As much as 20% of expensive pigments such as TiO^2 can be replaced with high-brightness Dicalite—and neither eye nor instrument can detect any loss of whiteness and brightness. No other diatomite extender surpasses the brightness of Dicalite filler-pigments. And in all the other properties you demand in a diatomaceous silica—easy grinding, fine particle sizes, correct particle size range and distribution—Dicalite meets your strictest standards.

Dependable GLC GREAT LAKES Dicalite®

Filler-Pigments WB-5, L-5, and White Filler have an average brightness of 90 on the GE scale

Dicalite Department, Great Lakes Carbon Corporation
612 South Flower Street, Los Angeles 17, California

as well as descriptions of the pneumatic programmer, unique sample cells and devices for measuring reagent.

NARROW AISLE EQUIPMENT

Copies of the March 1959 issue of the *Lever*, a 16-page magazine describing new developments and uses of 24-volt narrow aisle equipment to solve a wide variety of materials handling problems, have been made available from Lewis-Shepard Products, Inc., Dept. PVP, 125 Walnut Street, Watertown, Mass.

Of special interest in this issue is a feature article on electric passenger car design and the latest developments in the marketing of these units for public use.

Other articles in this presentation describe special designs in powered equipment that offer cost savings in many operations for industry. In addition, the firm introduces a new, heavy-duty two-wheel hand truck designed for extra heavy duty operations in warehouses and on terminal docks.

INSTRUMENT SELECTION

A comprehensive, 20-page brochure entitled *Selecting Instruments to Solve Your Analytical Problems* has been published by the Instrument Division, Perkin-Elmer Corp., Dept. PVP, Norwalk, Conn.

The brochure discusses the applications of instrumental analysis and its advantages. It specifically tells how and why infrared and ultraviolet spectrophotometers and gas chromatography instruments are used and the benefits obtained with them. Typical spectra and runs, and instrument schematics are used.

The brochure gives details of the firm's line of analytical instruments and accessories, and their applications. It also discusses briefly how infrared and gas chromatography can be used in conjunction to obtain a complete analysis.

SPECTROGRAPH

A new eight-page booklet entitled *Norelco Autrometer, Automatic Indexing X-ray Spectrograph* has been made available by the Instruments Division, Philips Electronics, Inc., Dept. PVP, 750 South Fulton Ave., Mount Vernon, N. Y.

Text gives complete engineering data on the instrument which employs a universal detector and automatic crystal changer to provide a fast, non-destructive analysis method for as many as 24 elements in a single sample.

Booklet deals with applications, operating principles and procedures, performance, calibration, reproducibility, automatic programming, and statistical accuracy. Specifications are included in the brochure for the main chassis, transformer, console, water and power supplies.

FLUORESCENT PIGMENTS

A four-page folder describing use of fluorescent and phosphorescent pigments in such fields as plastics, rubber, printing, paper, textiles and paints has been released by United States Radium Corp., Dept. PVP, Morristown, N. J.

The brochure lists some 15 different fluorescent pigments for a variety of applications in a wide spread of color ranges and brightness levels. Each formulation is accompanied by a brief section of additional technical data comprising laboratory and field test information. Known and potential applications appear with listings.

Seven phosphorescent pigments with varying colors are listed in the brochure. Additional technical data is included, together with a detailed listing of known and potential applications in a diversity of fields.

SOMEWHERE in Southern France, before the last Ice Age, one of our Stone Age ancestors sat by the fire in his cave dwelling. He was warm and, having just dined on roast bison, he felt good. Reflectively chewing on a charred bone to get at the marrow, he dreamily contemplated the buttery black paste—a mixture of burnt bone and fat—which so stubbornly clung to his hands. Seized by a sudden emotional impulse, he stepped to the nearest wall of his cave and drew a few tentative lines on the flat rock surface with his finger. The pigment he utilized—bone black—is employed by the paint industry to this day. Since the basic desires of our Paleolithic artist were centered on food—a dire necessity in the case of a nomadic hunting people retreating before the encroaching ice sheets—his initial aesthetic creative efforts eventually evolved into the outlines of animals he hunted for food.

None of these drawings had durability, of course. But some fine specimens were found in the Dordogne district of France where landslides, probably at the end of the last Ice Age, had hidden the cave dwellings of Cro-Magnon men for thousands of years. The first recorded evidence of the use of paint was thus preserved.

ST. JOSEPH LEAD COMPANY
250 PARK AVENUE, NEW YORK CITY 17
Plant & Laboratory: Monaca (Josephtown) Pa.

THIS IS NUMBER 1 OF A SERIES

Paint is used for one or more of four purposes: for *decoration*, for the *protection* of structural materials, for *sanitation*, and for obtaining better *distribution of light or greater visibility* of an object. These functions of paint were discovered in the order named, and all of these will be treated in succeeding advertisements.

ZnO—ONE OF THE PAINT INDUSTRY'S ESSENTIALS

LEAD SILICO CHROMATE

The Eagle-Picher Co., Dept. PVP, American Building, Cincinnati 1, Ohio has published a bulletin entitled, *Permox 1-4-3.*

A specific product data chart, a particle size distribution graph, and exposure illustrations are included.

Also included are primer coat, intermediate coat, and green finish coat color samples.

CHEMICAL EQUIPMENT

National Spectrographic Laboratories, Inc., Dept. PVP, 6300 Euclid Avenue, Cleveland 3, Ohio has announced a new loose-leaf catalog covering its line of spectrographic and analytical chemical equipment and laboratory services.

The new catalog consists of 12 individual product bulletins defining construction, features and giving complete specifications for their source units, microphotometers, sample holders, spectrographs, auxiliary equipment and custom units.

AEC PRICE LIST

A new price list of Atomic Energy Commission unclassified research reports for sale by the Office of Technical Services, U. S. Department of Commerce, is now available.

This cumulative listing of some 4,000 AEC reports in the OTS collection includes new documents acquired since July 1958. To obtain the new list, request AEC Research Reports Price List No. 31 from OTS, U. S. Department of Commerce, Washington 25, D C.

Price lists are issued semi-annually, and the next list will be available in August 1959.

FORK LIFT TRUCK

A fully-illustrated circular describing complete operating and maintenance features of its new Model "H" electric fork lift truck is presently available from Lewis-Shepard Products, Inc., Dept. R9-2-PVP, 125 Walnut St., Watertown, Mass.

The two-color, six-page presentation, designated Circular 37, points out how peak maneuverability has been incorporated into the Model "H" through exclusive rear-wheel drive and by recessing the mast between the load wheels.

MIXERS

The J. H. Day Co., Dept. PVP, 4932 Beech St., Cincinnati 12, Ohio has published a new 8-page bulletin, No. 500-159, describing the line of Pony mixers for efficient change-can mixing.

Construction details and specifications are given for gearless-type single and twin motion mixers, and for geared-type laboratory and production mixers.

Accessory equipment, including mixer cans and lift trucks, is also described.

HIGH-MELTING WAX

PE Tetrastearate, a hard, high-melting wax, is the subject of a new product data sheet published by the Hercules Powder Co., Dept. PVP, Wilmington 99, Del.

Product specifications, other typical properties, outstanding characteristics, compatibility, and typical uses are covered in the data sheet.

TITANIUM PIGMENTS

A 56-page booklet entitled, *Titanox White Pigments*, has been published by the Titanium Pigment Corp., Dept. PVP, 111 Broadway, New York 6, N. Y.

Properties and uses of Titanox are fully outlined.

try this formula with CARBIUM®

It provides lower-cost medium gloss WHITE INDUSTRIAL ALKYD ENAMELS

Carbium . . . Diamond's new dense precipitated calcium carbonate has outstanding flatting properties in medium gloss industrial coatings.

Properties obtained with the above formula are as follows:

60° Gloss Reading.....50°
Grind Gage Reading.....5+
Initial Viscosity.....78 KU
Film Appearance .....Smooth
Settling (1 month).....None

By using only a single extender pigment, raw material costs are reduced. For complete details on cost reduction and improved flatting properties through use of CARBIUM, write Diamond Alkali Company, 300 Union Commerce Building, Cleveland 14, Ohio.

	Pounds/100 gals.
Rutile Titanium Dioxide	254.0
CARBIUM	353.0
Lecithin	3.0
Aluminum Stearate	3.0
Long Oil Alkyd (70% solids)	166.0
Mineral Spirits	133.0
Pebble mill grind for 16 hours and add:	
Long Oil Alkyd (70% solids)	246.5
Mineral Spirits	20.0
6% Cobalt Naphthenate	3.0
24% Lead Naphthenate	1.3
5% Calcium Naphthenate	1.0
TOTAL	1,183.8

Diamond Chemicals®

LIXOIL

HAND CLEANER

REMOVES PAINT WITHOUT IRRITATION

- *with warm water*
- *with cold water*
- *with sea water*

or even

- *without water*

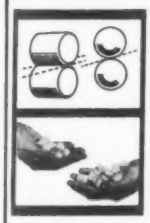
PREVENTS RASHES FROM SOLVENTS AND SAVES YOU MONEY

LIXOIL LABORATORIES
P. O. Box 35, Roslindale, Mass.

MONEY SAVER

DIAMONITE HIGH DENSITY grinding rods DO MORE WORK

better, faster and at lower cost!

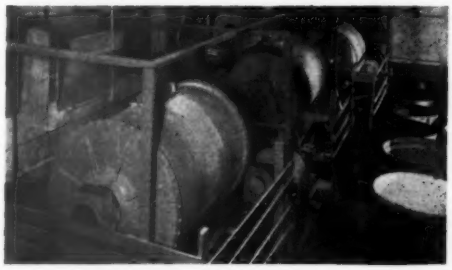


Greater grinding efficiency — cylindrical shape presents a plane of contact instead of a line offered by spheres or stone shapes.

High density — specific gravity of 3.5+. Weighs over 2½ times as much as same size in lighter material. Increases grinding speed.

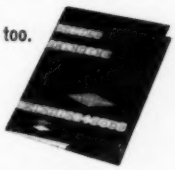
With 25 per cent less voids and more than 75 per cent greater weight per cubic foot than older media, Diamonite Rods naturally grind faster. The cylindrical shape affords more contact area, too, greatly increasing grinding efficiency. As much as 80 per cent reduction in grinding time is often reported. Sapphire-hard, abrasion-resistant Diamonite outwears other materials and retains shape and grinding efficiency long after other media are worn out. Such important advantages with valued cost savings make it worth your testing. Write today.

saves 1/3 on grinding time at paint manufacturer



Harrison Paint and Varnish Co., Canton, Ohio, says, "Our records show Diamonite best for Pebble Mill Operation." In tests with other media at Harrison Paint, Diamonite proved far superior. Besides reducing grinding time on latex and enamel type paints, the rods were still in use after four years at the same operational rate of 12 hours per day, 4½ days per week. Shape was retained with only a 37 per cent volume reduction.

We'll gladly arrange a test for your needs, too.



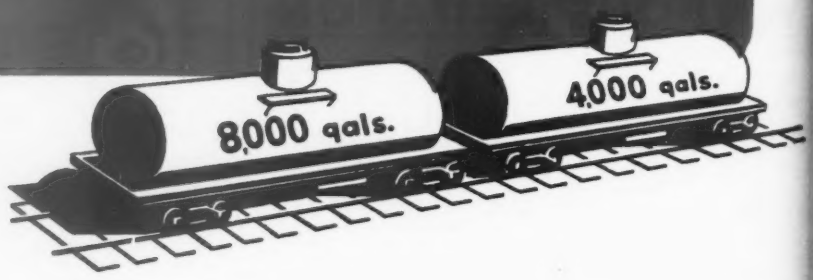
NEW DIAMONITE GRINDING ROD BULLETIN . . .
Send for your copy today.

DIAMONITE products manufacturing company
pioneers in the development of high alumina ceramics

SHREVE, OHIO • Phone: Joseph 7-4211

ODORLESS MINERAL SPIRITS

SOLTROL*



DEPENDABLE SUPPLY!

When you deal with Phillips, a pioneer in the odorless thinner field and a leading producer of high quality odorless mineral spirits, you are assured of adequate supply. You can *rely on* Phillips prompt deliveries!

CONSISTENT UNIFORMITY!

Every precaution is taken to protect the excellent physical and chemical properties necessary to assure you of uniformly good results.

CONTROLLABLE DRYING TIME!

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Also available in split cars

PHILLIPS PETROLEUM COMPANY
Special Products Division
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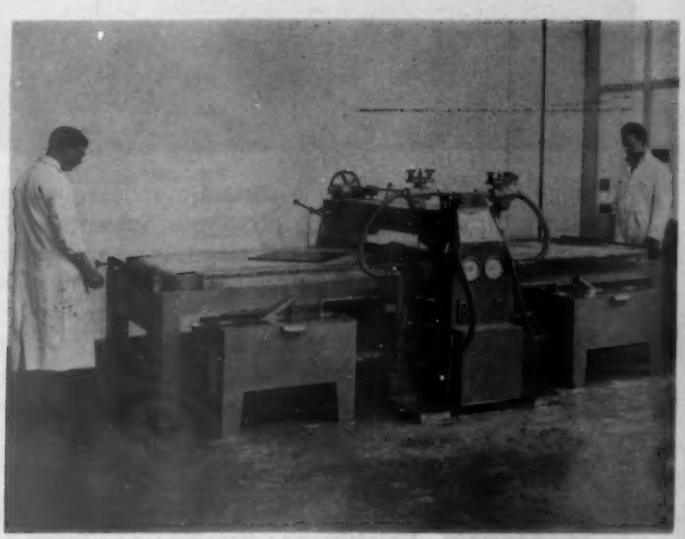
foreign developments

Polyester Lacquer for Furniture

Thixotropic Paints for Structural Steel



Curtain pouring machine for applying polyester finishes to wood surfaces. Polyester finishes for furniture are attracting considerable interest in Britain. For details of this development, see page 89.

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your SOLVENTS and CHEMICALS GROUP salesman

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BRITISH PAINT DEVELOPMENTS

Polyester and thixotropic coatings highlight general technical advance

THE main talking point in the industrial finishes side of the British Industry these days is unsaturated polyester lacquers. Their primary application at the moment is for wood finishing and over the last few years polyesters have attracted much attention without anyone knowing much about their practical use. Research laboratories have been working hard to turn out a finish acceptable to furniture makers, particularly because of pressure from German and other Continental firms who have been demonstrating their polyesters in British factories. The most sensitive spot in the furniture trade is the manufacture of cabinets for radio and television sets where competition is very keen. Geared to fast large-scale production lines, the cabinet makers need a lot of convincing to turn over to polyesters from cellulose lacquers and a valuable market awaits the polyester supplier who can break through.

Competition and also speed of production are much less important in household furniture making because of the more varied range of products manufactured. Here different conditions exist and unsaturated polyester lacquers with a longer pot life and freedom from wax have gained some acceptance. The public likes very high gloss furniture and manufacturers are ready and willing to cooperate.

Pigmented Types

Every year British Manufacturers produce their latest developments at the Furniture Exhibition, held in London's Earls Court Hall. This year the star feature in the finishing field has undoubtedly been the appearance, on a large scale, of pigmented polyester lacquers, now used extensively for kitchen furniture.

The polyester lacquers used do not contain any wax and the basic materials are being supplied by English and German firms. The finishes are applied using curtain coating methods and, when dry, the dusty surface layer (about 20% of the film thickness) is removed by belt sanding machines and the surface polished. All this means heavy investment in new machinery and naturally the lacquers are relatively expensive. However the surface appearance is excellent and leading manufacturers say that polyesters are certainly selling the furniture. Of course high solids materials are employed and the build is good, thus reducing costs.

Pigmented polyesters have brought other problems in their wake. Curtain coating means that every piece, which must be flat, is coated individually and burnished before assembly into the final unit. Redesign of kitchen furniture to meet this need has resulted in the disappearance of rounded corners and their replacement by a square angular look. Easy dismantling and assembly of units is a good selling point for furniture exports!!

Clear polyesters for furniture have been in use for some time and perhaps the worst of the troubles with them are over. Meredew, a leading quality furniture firm, say that their bedroom suites with high polyester finishes are selling well but this particular firm are waiting for the marketing of a good matt polyester lacquer before they are completely converted to polyesters. The trade seems to have little doubt that sooner or later cellulose will be replaced almost entirely by these new materials.

While furniture and television cabinets are both large-scale uses, polyester lacquers are getting some good publicity from speciality jobs, particularly from their success as boat 'varnishes' e. g. in varnishing the hulls and superstructure of small and large sailing craft. Unlike the American yacht *Columbia*, which was varnished with epoxy materials, the unsuccessful British challenger for the America's cup was treated with polyester lacquers. The interior hull timbers,

Application of Bitugel by brush shows build up on sharp edges.

frames and skin etc. of the yacht *Sceptre* were coated by brushing on a clear finish using a thin priming coat followed by three full coats. Similar pigmented polyester lacquers, supplied by Cellon Ltd. (a name well known in the aircraft world), were sprayed on the outside of the hull. Even though applied in very cold weather, the lacquers gave smooth glass-like surfaces having extremely high resistance to moisture penetration but little anti-fouling action.

Thixotropic Paints

In the field of retail paints there is no doubt that the "Do-It-Yourself" market in Britain gave a tremendous welcome to thixotropic paints. Cray Valley Products manufacture the Washburn alkyds for Europe and some fifteen to sixteen paint manufacturers now sell paints based on these products. Other companies are producing their own thixotropic media, such as Beck Koller's *Beckogel* 1480 made by the addition of an undisclosed fatty amino-compound. One paint producer was several weeks behind his delivery dates last spring and could not keep up with the current demand for his product, a one coat odorless thixotropic selling at about the same price as a conventional paint. It seems likely that once the first rush has ceased, the Do-It-Yourself field will take a steady supply of thixotropic paints, perhaps supplied in tubes, while thixotropic media are used in more conventional finishes for professional decorators and other big users who are well able to appreciate the advantages such as reduced pigment settling, absence of sagging or curtaining, etc. but are not interested in dripless gels. Evidence that thixotropy is here to stay is provided by the news that one of the most conservative companies, Imperial Chemicals, has brought out a new series of media called *Modulacs* for this purpose.

Thixotropic Bitumen

To resist corrosion on bridges, dock gates, chemical plants and other places where there is heavy

Removing Bitugel film. Note flexibility, film thickness, and residual adherent film.

attack by salt water or acids and chemicals, Evode Ltd. makes a thixotropic bitumen composition called *Bitugel*. The thixotropy is obtained by the use of an additive and after brush application, *Bitugel* very rapidly regains its gel state. The bitumen is reinforced to give good build; one coat alone produces a thickness of 0.75 mm without any running or sagging on vertical surfaces, yet it remains liquid for long enough for the brush marks to disappear.

Emulsion Paints

Quite a few emulsion paints can be produced with a light gel-type structure these days, though the advantage to be gained is the absence of pigment settling, not thick coatings. The gel can easily be broken down on stirring so that the emulsion is free flowing for brush or roller application. With *Vandike* 2100 emulsions (British Oxygen Chemicals Ltd.), well-bodied paints can be made with only 50-54% solids and these emulsions also have good scrub resistance. *Vandike* 3015 emulsion is an internally plasticized vinyl acetate copolymer in which plasticizer migration is completely absent and they are said to be equivalent to polyvinyl acetate homopolymers externally plasticized with 15% dibutyl phthalate (based on total resin solids). This permanent plasticization gives paint films which do not embrittle due to loss of plasticizer on aging.

While emulsion paints are never likely to be serious rivals to standard alkyd paints, the converse is not necessarily true and one British firm has already been working on water-thinned alkyd materials. There can be little doubt that where very good surface coverage is required, and durability is important, i. e. when emulsion paints are not good enough, but solvents cannot be used, water-thinned alkyds offer great advantages in absence of solvent and lack of smell. In many places—food processing plants, bakeries, dairies, hospitals, etc.—the solvent types of paint cause great havoc since rooms or working areas being painted must be evacuated. Odorless solvents

Bridge coated with Bitugel for protection against corrosion.

are no help in overcoming this handicap since they can be tasted in food. Certainly in such locations, price problems will be no great handicap once the problem of stabilizing the alkyd dispersions have been overcome.

Research on Drying Oils

While it is necessary to import virtually all oils and oil-containing sources, a number of firms have been in the forefront of research into new and improved oils for paint use; the name of Younghusband, Barnes & Co. is well known for work carried out on drying oil/cyclopentadiene media. A new class of film forming materials developed in the BOCM laboraties are *Trokene* unsaponified vegatable oil derivatives which bleach as they dry. These binders are low density, normal viscosity products which have abnormally high Wijs iodine values. They brush as easily as stand oils yet dry rapidly and hard like alkyds. These derivatives are free of ester groups giving *Trokene* paints a good alkali and chemical resistance. These paints also have low odor when made with odorless solvents. Odorless paints have been well publicized as a selling gimmick and development work on oils for non-yellowing and odorless alkyds has been carried out with trimethylolpropane as a replacement for glycerol in order to obtain better alkali resistance. Alkali resistance is prominent in the mind of most producers of industrial finishes since modern detergent materials make strenuous demands on baked films on washing machines, etc.

Britain is not lagging behind other countries in the use of paint to aid road safety and cut down the road death toll. Colored paints at the moment do not find favor on the highways but several well known firms are developing much superior road marking paints. Experimental stretches of main highways have been painted with reflecting types of paint originally developed for airports. The tiny glass beads or "ballotini" used in these can cause great difficulty in application and development work and has resulted in machines able to put down the beads inside a paint film or to spread them on top of the wet film. There is much divergence of opinion here and abroad on the best way to use these glass beads.

Zinc-Rich-Paints

One of the really great developments in the materials applied to steel structures for crrosion protection has come from research workers who during the war developed zinc-rich paints. Experimental work at Cambridge University by a team from the British Iron and Steel Research Association showed that paints containing 92-97% of zinc had superb anti-rusting properties, equivalent to an electrolytic galvanized coating. The use of these paints has in fact erroneously called cold galvanizing. The binder-coated pigment particles (the binder:pigment volume ration is 1:1.6) are usually in initial metallic contact with the iron surface to which they are applied and offer cathodic protection. As the coatings are attacked by sea water, moisture or other corrosive agents, the cathodic protection is rapidly lost but the zinc corrosion products (particularly basic zinc oxides) pack the film and cover bare surfaces, e. g. exposed by damage, giving an excellent seal against further penetration of the corrosive agent.

Dispersion Equipment

It is quite customary for firms in Britain to produce what are known as "smalls". These are small orders for special materials for example a few gallons of a trial batch, and are often a headache for production managers. It was to deal with these problems that the *Steel-Shaw* high output ball mills were developed recently. They consist of four pots (vertical cylinders) which rotate about their own axes and at the same time rotate about a common central axis so that they make a planetary motion. The resulting combined centrifugal force presses the material to be ground, with a charge of balls, against the wall of each pot so that they move round it in a vertical tumbling and twisting column. Grinding is very intense and an operation taking 20 hours in an ordinary ball mill requires only 2 hours in the new mills to reach the same level of dispersion. Since four separate pots are used, four different materials can be ground at the same time; also the pots are interchangeable, thus reducing the time lost in cleaning, etc. to a very low level. Two sizes of mills are made: one has four pots of 2½ gallons (Imperial) each while the other, for laboratory work has pots containing 2½ pints.

Synthetic Resin Developments

The major producer of styrenated oils in Britain is Styrene Co-Polymers Ltd., formed in 1948 to work the Berger and Pinchin-Johnson styrene patents. Their newest product is *Scopol* 55*M*, a styrenated alkyd with a special drying time. This binder has been prepared for use in paints intended to be applied to surfaces by brushing and thinned with white spirit, and having an air-drying time of 1 hour or less. This is particularly useful when recoating is carried out soon after the original coating, e. g. in about 4 hours. It is claimed to be the first alkyd giving a high gloss surface when pigmented with toluidine red pigments. Its use is recommended both for household enamels (resistant to boiling water, fruit juice, fats, margarine, vinegar and detergents) and for industrial finishes. Because the surface of a paint film sets very rapidly, it very quickly becomes insensitive to rain-spotting (an important point in the British Climate) and may be employed in the maintenance of highway signs, telephone boxes, and all outside paintwork. They have the added attraction for outdoor sites that they are non-chalking.

This firm, together with others such as British Resin Products Ltd., also make similar binders modified with vinyl toluene in place of styrene. While these vinyl toluenated media share the same properties such as bloom resistance, adverse weather drying and high durability, they differ from styrenated alkyds in being generally compatible, especially with oils and pure alkyds. With a drying time of about 4½ hours, they too may be used for decorative finishes applied in bad weather.

*Epok Resin AL*620/75 made by B. R. P. is an interesting long oil alkyd modified with vinyltoluene with orthodox long oil properties such as outstanding durability and gloss retention, but also with some

piccopale emulsions

A complete line of PICCOPALE EMULSIONS is now available. They are designed for quality improvement of virtually every latex and resin emulsion. Among their specific advantages are: excellent pigment binding, easy soil removal, high resistance to alkalies, compatibility, excellent adhesion, stability.

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features normally encountered in short oil types. It dries rapidly and has reduced blooming and yellowing tendencies.

Paint Developments

One of the firms exhibiting at the Brussels International Exhibition was Detel Products Ltd. and their eye-catching exhibit was an aluminium heat resisting paint. A metal plate coated with the paint was mounted over a Bunsen burner while drops of water dripped on to it from a container placed above the plate. Even though the plate is at a temperature of 500°C, the coating is not affected. The paint is resistant to corrosion at temperatures up to 600°C.

Detel specialize in paints for corrosion protection and another of their new products is based on an epoxy-pitch composition. It is a two package material and is said to combine the water resistance of pitch and the chemical resistance and hardness of epoxy resins. Not suprisingly, it is thixotropic so that coats of up to 0.25mm can be obtained in as little as two applications. It does not, however, bleed through and can act as a primer for certain decorative paints. It is particularly recommended for tanks and tankers.

I. C. I. produce silicone surface coating resins for heat resistant aluminium enamels, e. g. of the over 500°C type but these enamels are of course water-repellent and can be used to produce white enamels which are virtually non-yellowing and non-chalking. Colored silicone finishes can be used at temperatures up to 250°C without darkening or crazing.

While the days of startling new developments in the paint industry may be over, Britain is still the meeting ground for paint producers all over the world. Many of the principal manufacturers are linked by agreements with similar companies in the United States, like Sherwin-Williams and du Pont, and to Continental firms, while some American Companies have subsiduaries in Britain. This has meant that fierce competition is backed by the technical resources of the world's laboratories and the products of the British industry are of interest to all paint users and makers.

BALL AND PEBBLE MILLS

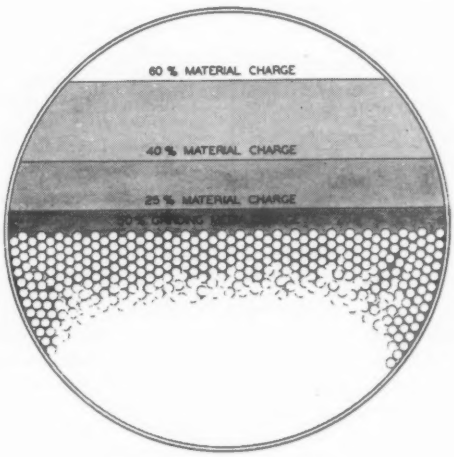
(*From page 30*)

basically used on whites and lighter shades where discoloration cannot be tolerated.

Where dark colors are involved, the majority of mills being used today are steel ball mills. Because of the extra weight of the steel balls grinding is faster and, as we can use very small sizes, we are also able to obtain a finer grind.

Batch Loading

Normal batch loading ranges from 30 to 40% of the total volume of the mill. It is possible to run as low as 25% and as high as 60%. An important consideration relating to the size batch is the effect this has on grinding time. Fastest grinding occurs with the smallest batch.



Levels of material charge.

We roughly estimate that a 40% batch will take twice the time required for a 25% batch, and a 60% batch four times as long as a 25% batch. There are many instances where the 60% loading is involved, that a suitable fineness cannot be developed regardless of the length of time the mill is allowed to run; consequently, it is best to avoid such high loadings.

On some bulky type pigments, where the mill is unusually crowded during the loading operation, we find it advisable to follow a step loading procedure, rather than attempt to charge an excessive amount of pigment into the mill at the start. By step loading, we avoid the danger of pigment reaggregation and are actually able to obtain a faster prewetting of the charge.

Laboratory Runs

Laboratory mills are very successfully used in the development of proper formulas for the production equipment. It is possible to set up production schedules as a result of laboratory work. Most important is to try to combine, in one formulation, the raw materials that are most compatible with each other. This applies especially to the vehicles and solvents. In this way fast, efficient, wetting and grinding are assured and pigment reaggregation is reduced to a minimum.

Low vehicle solids has unquestionably been a big factor in reducing grinding time, not only in ball and pebble mills, but in other types of grinding equipment as well.

I would like to review some of the advantages in the operation of ball and pebble mills that have maintained the popularity of these machines throughout these many years:

1) They completely seal the product during the entire manufacturing cycle. This prevents evaporation and adds to the stability and uniformity of the batches. Of equal importance also, is the extra wetting time during the grinding cycle, adding further to the stability of the finished product.

2) While we like to see the rules followed; nevertheless, even with poor formulation and lack of control in the grading of pigments and fillers, once the batch is loaded it is usually possible to obtain a finished paint.

3) Compatibility of the raw materials is desirable but not a strict requirement.

4) There are no exceptions in the type of pigment the mills can handle, whether hard or soft, fine or coarse.

5) They are good for year-round performance without periodic parts replacement.

6) Heating or cooling can be accomplished in the same mill.

7) They have the lowest labor cost per unit of material, and no skilled labor is ever required to operate them.

8) No mechanical regulators are necessary

9) A range of sizes is available for every production requirement.

10) Inexpensive laboratory equipment that will duplicate production runs is available in a variety of types and sizes.

WATER GROUND
MICA
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EXTENDER PIGMENTS
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ROLLER MILLS

(*From page 33*)

operation will adversely affect production rates and quality of the finished product. Needless to say production loss from worn equipment will reflect in the gross annual profit of any firm.

The following checklist is offered as an aid in determining when reconditioning becomes necessary.

A - Appearance of roll surface. A wavy or corrugated appearance may indicate gear bottoming, shaft eccentricity or loose roll shaft components. Shiny bands are evidence of uneven wear.

B - Unsatisfactory roll coverage of the product film which cannot be corrected by roll adjustment or by changing the flow of cooling water to the rolls might indicate a need for regrinding of the rolls. Watch for "return bands" of the paste film on slower rolls. If fineness of grind across the roll varies by over 10%, in all probability, the roll is unevenly worn.

C - If the rolls are in proper working condition, it should be possible to turn the rolls by hand when all adjustments are open.

D - A very loud rumble when the machine is in operation may be due to the gear teeth which are binding or bottoming. This may happen as the roll wears over long periods of service.

E - Increased noise in the bearing and failure of the rollers to carry the product film properly indicates failure of roller bearings. Another indication of roller bearing failure is that the surface temperature of the bearing housing will be much higher than other housings.

F - Excessive local heating or "hot bands" on the roll surfaces may be due to inefficient heat transfer. Clogged water passages and/or accummulation of mineral deposits on the interior of the rolls will bring about this condition.

G - A misalignment of the edges of the roll working faces may be due to bearing trouble. A raised ridge will appear at the edge of one or more rolls if the rolls have been out of alignment over long periods of operation.

H - In the vertical type, four and five roll mills, there must be sufficient clearance between the bearing housings and cross frames to allow for roll adjustment within the operational range. Generally, interference between these parts must be corrected at the factory.

I - Leakage of water around the outside of the shaft next to the roll face indicates a loose shaft which should be replaced at the factory. Water leaks will invariably show up if the roll has been cracked.

J - On roller mills equipped with sleeve type bearings, bearing can be checked by attempting to lift the roll journal in the sleeve bearing with a crow bar. If there is sufficient play to be noticeable, bearings are probably badly worn.

Who should do the reconditioning merits some consideration. Since reconditioning reqiures special skill and experience, it is advisable that such work be performed by the manufacturer of the machine for he is in the best position to cope with any technical problem that may arise in the reconditioning process. Furthermore, the manufacturer has the exact type of equipment necessary to do a satisfactory reconditioning job. For example, some manufacturers have a special grinder which will redress roll surfaces to tolerances within ± one ten thousandth of an inch.

CLASSIFIED ADVERTISEMENTS

Rates: $.20 per word, except those seeking employment, for which rate is $.10 per word. Minimum: ten words. Address all replies to Box Number, c/o Paint and Varnish Production, 855 Avenue of the Americas, New York 1, New York.

POSITION WANTED

Heavy experience in the formulation of all types of latex emulsion coatings; also development of organic coatings and primers for wall-board and ceiling tile. Supervised tne production of such coatings. Box 559.

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Chemist-representative, need lines, materials and equipment for paint, plastics, rubber and chemical industries. Penna., N. J., Del., and South. Reply Box 5591.

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SELECTS M.P. 270-280°F. AND 290-305°F.
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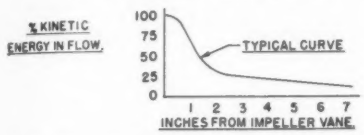
CARLOAD AND LESS CARLOAD STOCKS
AVAILABLE FOR IMMEDIATE SHIPMENT
ZC O

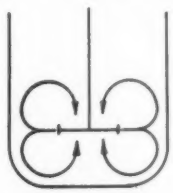
MOREHOUSE MILLS

(*From page 36*)

2. Creates zone of intense turbulence.
   Two actions cause rapid hydraulic attrition in this zone: Shear-rubbing of particles on each other and scrubbing of liquid phase on surfaces of solid phase.
   Impact-particle collisions due to directional differentials.



3. Concentrates energy close to impeller.
   The turbulent zone is a zone of intense energy dissipation. Nearly 75% of the kinetic energy is used for hydraulic attrition in a distance of 1″-2″ from the impeller vanes.



4. Causes laminar flow for "total motion."
   Beyond the turbulent zone the movement becomes laminar. This flow divides at the vessel wall assuring complete circulation of the entire batch. Turbulence does not interrupt flow pattern.

Power Transmission Systems

Advanced engineering of the Cowles power transmission systems make it easy for the operator to apply the correct speed during each mixing phase, and provides for positive, automatic delivery of the power required at the time required. This assures the operator complete control in all dispersing stages, whether viscosities are greatest at start, mid-point or finish.

Flexibility and Economy

The Cowels performs many operations easily; can be adapted to existing equipment, tankage and plant. By quick change of speed, type of impeller or depth of impeller in the tank, the dissolver can often be made to replace several conventional machines, with swift changeover from job to job.

Although the ultra-high speed Cowles dissolvers apply higher horsepower than ordinary units, they actually reduce power costs on a per-pound basis because of their greater speed and efficiency.

Operating Time and Maintenance

The Cowles is designed and built to give a lifetime of trouble-free operation. Its light weight but strong construction, its fewer moving parts and simple lubrication make maintenance an easy job for regular operating personnel. It creates no surge or splash. Surfaces which come in contact with materials have no hones or gaps to foul with solids, are easy to clean. Operation time and maintenance costs are savied. There is very little down time. Periodic overhauls are not required.

Wide range of Models

A larger variety of models and impeller designs are available for many applications. From small laboratory or pilot plant models, to big-volume production units, motors range from 1 to 100 horsepower. Various sizes of stationary, hydraulic lift or tip-up models are available, depending on need. Variable or constant speed drives are also available. All models are specially engineered to meet process and volume requirements.

"Teams" Multiply Advantages

Many users report excellent results in "teaming" the Morehouse Mill and Cowles Dissolver. Used in proper size relationships, the two machines multiply each other's production rates substantially and contribute to a more versatile operation. In a typical setup, the Cowles is used for premix which is pump fed to the mill. The Cowles is then easily shifted to receiver vat for let-down. Portability of many Cowles models makes this operation simple.

Morehouse and Cowles equipment is distributed by Morehouse-Cowles, Inc., 1150 San Fernando Road, Los Angeles 65, California. The firm maintains representatives in principle cities, and extensive engineering services for special adaptation of equipment. Policy includes trial installations at no risk to the user.

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SKINS
SOLIDS
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AND OTHER
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SUBSTANCES
from polluting your Varnish and Lacquers

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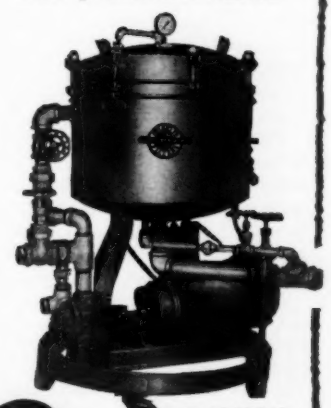
HORIZONTAL PLATE
FILTERS
will assure perfect clarity and brilliance



SPARKLER horizontal plate FILTERS

Model 18-S-12 Varnish Filter (steam jacketed)

Our engineers will give personal service to your problems.

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THE RIGHT BALANCE

in HIGH DENSITY and TOUGHNESS for most efficient grinding

ARLCITE
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ARLCITE'S high density and tough bond strike *the optimum balance* between weight and wear resistance for lowest cost grinding. Fastest grinding is assured without sacrificing rugged wearing qualities. Research and plant production records prove conclusively that only Patterson Arlcite provides this RIGHT combination for the most efficient and economical grinding performance.

The exclusive tongue and groove feature in Arlcite blocks insures an interlocked, tightly keyed lining with narrowest cement joints. For full information on Arlcite Balls and Blocks and their outstanding service advantages, write for our latest Bulletin.

PORCELAIN DIVISION

FERRO CORPORATION
East Liverpool, Ohio

COLLOID MILL AND SUB-MICRON DISPERSER

(From page 44)

fined to the SMD valve assembly, and this can readily be replaced and the old parts reground for additional use.

Dimensions, operating pressures, capacity and horsepower requirements are shown in Table II of specifications for the Sub-Micron Disperser.

We have mentioned that the Sub-Micron Disperser unit has proven itself in fields where the pigments themselves have extremely small ultimate particle sizes and the maximum color and degree of dispersion is essential. These include such items as pulp color dispersions for latex paint tinting, textile printing inks, carbon black dispersions, dispersions for dope dyeing of synthetic yarns, vat dyestuff dispersions, fluid inks, lacquers, enamels, etc. It must be remembered that in order to obtain the maximum value from the SMD unit, the coarse pigments or pigments with excessively large agglomerates should not be processed without some form of pre-treatment such as a short ball milling or processing through a Colloid Mill of some type. This short pre-treatment permits the SMD to operate at maximum efficiency and eliminates excessive wear in the SMD valve assembly. In formulating for the SMD unit, it must be kept in mind that the dispersing action is caused by high velocity shear and impact, not internal shear as with a roller mill or a heavy-duty mixer. For this reason, the vehicle phase of the dispersion should be as fluid as possible, formulating with all the thinner permissible and only sufficient resin to prevent reagglomeration of the dispersed pigment. If these formulation conditions are met, it is possible to prepare dispersions of the ultra-fine pigments that cannot be duplicated with any other equipment.

SMD Frame and Model Size	Max. PSI Operation	Capacity GPH	HP Requirements	A	B	C	D	E	F	Wt. Approx.
125 KL3-5RS 75 KL3-8RS	5000 8000	125 75	7½ 7½	33	29	37¼	28	15½	5"	1500
325 KL6-5RA 150 KL6-8RA	5000 8000	325 150	20 15	45	39	41½	43¼	19⅜	6"	3500
550 KL12-5RA 325 KL12-8RA	5000 8000	550 325	30 30	53	47	45½	51¾	25½	6"	5400
900 KL24S-5RA 675 KL24S-8RA	5000 8000	900 675	50 60	70	52½	53	67¾	36	7½"	9400 9400
1425 KL24X-5RA 875 KL24X-8RA	5000 8000	1425 875	75 75							10000 10000

Note: Dimensions D & E ± ⅛"
Cast lug base extends 2½" beyond base.

Table II. Specifications for Sub-Micron Disperser.

NOTHING AS FLAKY AS
MICA
WATERGROUND
AND MICRO
A small amount of Mica goes a long way . . . because it is ALL FLAKES. No other extender pigment is as flaky and the value of a platy structure in an inert pigment has been long established.
50 YEARS OF PRODUCING FINELY GROUND MICA
The English Mica Co.
STERLING BUILDING, STAMFORD, CONN.

CYCLIZED RUBBER

(*From page 52*)

application of cyclized rubber paint and varnishes in a closed or poorly ventilated rooms. Other solvents may be added to obtain certain properties, such as alcohols, ketones, glycol-ethers to reduce the viscosity; diphenoxy-ethyl-formal or, turpentine to improve brushability. Aromatic solvents, especially xylene, are not recommended due to its strong solvent retention. Cyclized rubber paints and varnishes can be applied by brush, spray, roller and dipping. Paints and varnishes adjusted to spray consistency and having a high solids or binder content can be applied without "cobwebbing."

If several coats of cyclized rubber paints or varnishes have to be applied, recoatability without lifting the previous coat is obtained after 8-24 hours air dry. The total paint job should be completed within several days. Interruptions of several weeks between the applications of coats should be avoided, because the bond between the various coats may be impaired, due to insufficient softening of the previous coat by the solvent used.

In case of permanent exposure to corrosive liquids, such as storage tanks, the paint system must be practically free of solvent residues and completely dry and hardened. Under normal conditions, 14 days are usually requested. Elevated temperatures shorten the times between coats considerably.

Design of Paint Systems

Durability and effectiveness of a good corrosion resistant paint-jobs depends to a large degree on the preparation of the substrate and on the total thickness of the coating. This general rule naturally applies to cyclized rubber resin based paints as well. Before a cyclized rubber paint is applied, the surface condition of the object to be painted must be considered. Metal parts should be clean of grease and oil and be rust free. The preparation of the substrate can be carried out in various ways. It is usually advisable to sandblast, if steel parts are heavily corroded through chemical attack. The importance of this procedure mustbe stressedbecause such precautions are often neglected in field applications. Even the best material cannot last if applied over a porous, corroded surface saturated with chemicals and corrosion residues. Without removal of the attached and corroded layers by sandblasting or flame removal, the application of new paint coats is useless. Long-lasting corrosion resistant protective coatings are obtained with cyclized rubber providing the substrates are properly prepared.

The number of coats to be applied has been mentioned before. Generally a total film thickness of at least 150 microns is requested to produce adequately corrosion resistant coatings. The thickness of a paint system depends naturally on the roughness of the surface, for example, steel. Smooth surfaces require 3-4 coats, but for rough surfaces such as, castings or rough porous surfaces, the number of coats to be applied has to be increased to cover the rough edges of the profile sufficiently. Too thin a coating over edges of a rough iron surfaces may endanger the protective value of the entire paint job if exposed to corrosive conditions, because the first beginnings of corrosion at one point may cause the fast destruction of the entire surface. It is also advisable that the surfaces to be painted are dry and pores are free of chemical residues to eliminate the danger of under rusting from the beginning. In special cases, such as repair work in operating plants under highly humid conditions, painting may have to be done under constant application of heat.

Humidity plays an important part during the drying period of coatings, and the removal of solvents from rooms or vessels is also important. Special attention should be given to application conditions of all corrosion resistant paints.

Primers must designed to fit the requirements of a total system serving corrosion resistant purposes. For highest requirements, red-lead primers based on Alpex-Arochlor are to be preferred which should be applied in two coats. Rust protective paints for outside use without exposure to chemicals, red-lead paints based on a linseed oil or alkyd reinforced with Alpex are superior. Important for the protective value of a total paint job is good wetting and coverage of the surface by the primer. Primers should, therefore, be liquid enough, but not short of binder. It is extremely important that the top paint coats are designed to fit each other as well as to the primer to assure best adhesion and durability of the total system. It is advisable to apply the coatings quickly and without too much delay.

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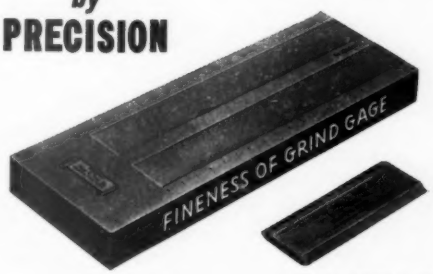

3½" × 9½" × 1"

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- Two 1"-wide paths—twice the measuring area of ½"-wide path gages.
- Longer paths—more spread between calibrations.
- Choice of scales—Hegman, PC, MIL, NS, Micron.
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PRECISION GAGE & TOOL COMPANY
320 E. Third St. Dayton 2, Ohio

STANDARD ULTRAMARINE and COLOR COMPANY in 50th YEAR

COINCIDENT with progress is change. This is particularly true of the Standard Ultramarine & Color Company which, through fifty years of growth, has undergone considerable change from the day it started making ultramarine blue pigment in 1909 at Tiffin, Ohio. While change is inevitable with any company in business for fifty years, the basic product—ultramarine blue pigment—is still SUCo's forte.

In 1912, attracted by convenient transportation, adequate fuel and ample labor, the company moved to Huntington, West Virginia, its present site. During the earlier years, the company manufactured only ultramarine blue and in 1925 embarked on a major expansion program which resulted in the production of alkali blue presscakes, acid and soluble blues, and fuchsine. Expansion and development continued right up to 1948 when SUCo entered the phthalocyanine field. SUCo present production covers eight major classes of pigments, which totals 600 products in all. The wide range of pigments include ultramarine blue, blanc fixe, amonium sulfide, alkali blues, fuchsine, phthalocyanine pigments, methyl violet, benzidine yellows, hansa yellows, and organic reds.

The key to survival of any company today is research. In line with this business philosophy, SUCo carries on an extensive product research and development program which is presently divided into two broad categories: research leading to the development of new products or modification of existing products, and thorough application research. As would be expected in many instances, the complete cooperation of the Sales Department and the Research and Technical Service Divisions is necessary for the solution of a number of the major problems. For example, in meeting the pigment requirements of the paint industry, SUCo is constantly engaged in evaluating its pigments and color in new paint systems. These include latex emulsions, water-soluble resins, new automotive finishes such as acrylic lacquer, and specialized coatings such as vinyl plastisols, etc. In addition, considerable effort is being directed to improve the dispersion properties of pigments, increase their versatility, and moreover make them available in a form which facilitates their handling in the manufacture of paint products.

In recognition of the ever-changing pigment requirements, the Technical Service Division maintains complete laboratory facilities to process customer service requests relating primarily to printing inks, paints, and plastics. Not only does this Division assist the sales department in relation to specific cutomer problems from an evaluation standpoint, but they also collaborate with the men in the field in making direct customer contacts to lend further assistance in solving any given problem from the industries mentioned.

The basic concepts associated with the establishment of the company's Technical Service Division also led to the reorganization of the Domestic Sales Department early in 1955. This Department is presently managed by J. R. Searls, a member of the company's staff for 13 years. Certain facets of this reorganization program are worthy of mention since these reflect a progressive approach in the field of technical product sales, consistent with the company's basic policy of supplying products and service superior to competition. Technical advancement in the industries served by SUCo is rapid and results in rapid changes in pigment specifications. To better serve the future needs of these industries, increased emphasis was given to market analysis; the first step toward reaching this goal, the coordination of market, scientific and application research, was provided by the creation of the New Product Development section of Domestic Sales. Through this section the customers' requirements for present and future products guide the company's research program. The new products, born of research effort, are thoroughly evaluated in the application laboratory and then field tested in a restricted manner under New Product Development control. SUCo has found this increasingly successful; it saves customers' time in evaluation, and substantially increases research efficiency.

SUCo has a program designed to keep sales personnel well posted on changing pigment requirements in the industries served, and on companys' products and capabilities. To provide a thorough understanding of the development work carried on by its research laboratories, as well as a better understanding of the ever-changing pigment requirements, a refresher training program has been established whereby all field personnel are brought to Huntington twice a year. The field men have a three day course of lectures, laboratory demonstrations, and discussion groups keyed to the latest technical developments. Two additional days are alloted for review of specific customer problems. This is supplemented by a weekly sales digest, technical bulletins and special sales aids.

Foreign sales are handled by H. L. Porter who has been a company member for the past 12

Technical service laboratory where colors are evaluated in various applications.

Extensive research is carried on for developing new colors.

Spraying panel in technical service paint laboratory.

Dumping color which has just been filtered.

years. Agency representation is maintained in Europe, the Far East, South Africa, Latin America, and generally throughout the free world.

SUCo presently employs approximately 590 employees, of which 425 are plant employees.

The president of the company is Henry Dourif. Mr. Dourif is a native of France, now a United States citizen. He was educated in France and in 1906 began his industrial career as an engineer with Deschamps-Freres, manufacturers of ultramarine blue in France, later working in the same industry in England.

He came to America in 1911, engaged by SUCo to solve the technical problems of the new company. The successful solution of these early problems led to his appointment as technical director. This was the beginning of a close personal and business association with O. T. Frick, one of the founders of the company, which lasted until Mr. Frick's death in 1949.

The title of "Major," by which he is customarily addressed, is no honorarium, for Major Dourif returned to France at the outbreak of World War I and served with distinction in the French Aviation Service for which he was decorated March, 1916 with the Legion of Honor and the Croix de Guerre.

W. H. Stark, executive vice president and general manager, joined Standard Ultramarine and Color Company in 1954 as assistant to the president, and a year later was appointed to his present position.

As a result of the progress made over the last half century, Standard Ultramarine and Color Company is now considered as one of the leading pigment manufacturers in the United States. SUCo is the only domestic producer of ultramarine blue, the leading producer of alkali blue, one of the top producers of azo colors, and a growing factor in the iron blue and phthalocyanine fields. Annual sales volume is now in excess of seven million dollars, and while its principal markets be within the United States, a substantial part of the companys sales are in markets throughout the free world.

NEWS

NEWS OF COMPANIES, ASSOCIATIONS
TECHNICAL GROUPS
ITEMS OF GENERAL INTEREST

North Dakota College Announces Symposium

The Coatings Technology Department (formerly the Department of Paints, Varnishes, and Lacquers) at the North Dakota Agricultural College announces that a symposium on "New Coatings and New Coatings Raw Materials" will be held in the School of Chemical Technology on the College campus, June 1-4, 1959.

The symposium will cover the newer areas of coatings; namely, the vinyl and latex emulsions, urethanes, silicones, epoxy resins, epoxy oils, epoxy emulsions, polyamides, cellulosics, polycarbonates, hydrocarbon-derived drying oils, and the newer developments in tung oil and alkyd resin technology. Specialists will treat each subject from the theoretical and practical points of view. The discussions are designed for group leaders and senior chemists.

Complete details may be obtained by contacting the Coatings Technology Department, School of Chemical Technology, North Dakota Agricultural College, Fargo, N. D.

SYMPOSIUM PROGRAM

Sunday—May 31 . . . . . Registration

Monday—June 1 . . . . . 9:00 A.M.
Welcome to NDAC
Dr. F. S. Hultz . . . President of NDAC
Welcome to School of Chemical Technology
Dr. R. E. Dunbar
Dean, School of Chemical Technology
Announcements
Dr. A. E. Rheineck
Coatings Technology Department
Greetings from the Federation
H. G. Sholl, President
Federation Paint & Varnish Production Clubs
The Coatings Course at NDAC
Dr. A. E. Rheineck

1. *Influence of Molecular Structure and Functionality of the Polyol in the Design of Alkyd Resins*
Dr. C. L. P. Vaughan
Hercules Powder Co.

2. *"C-oil" and Butoxy Resin Polymers of Hydrocarbon Origin for Coatings and Laminates and Glass Reinforced Structures*
D. F. Koenecke
Esso Research and Engineering Co.

3. *Silicones in Coatings*
K. R. Meath . . . . . Dow Corning Corp.

Tuesday—June 2 . . . . . 9:00 A.M.

4. *Epoxidation—Process and Products*
Dr. Dan Swern
U. S. Department of Agriculture

5. *Reactions of Epoxidized Oils*
Dr. T. W. Findley . . . . . Swift and Co.

6. *Tung Oil Chemistry and Coatings*
Dr. F. G. Dollear
U. S. Department of Agriculture

7. *Urethane Coatings—Practice and Application*
Dr. W. J. Remington
E. I. duPont de Nemours and Co.

8. *Oil Modified Urethane Coatings*
J. M. Stanton . . . . . Cargill, Inc.

Wednesday—June 3 . . . . . 9:00 A.M.

9. *Epoxy Coatings Structure Related to Origin and Performance*
Dr. S. O. Greenlee
Greenlee Research Co.

10. *Applications of Epoxy Resin Emulsions*
Carl Thorstad
Jones-Dabney Company

11. *Relationship of Polyamides and Epoxy Resins in Corrosion Resistant and Maintenance Finishes*
Dr. Don Floyd . . . . General Mills, Inc.

12. *New Developments in Applications of Epoxy Resins*
Dr. George Somerville
Shell Chemical Corp.

13. *Reactions of Half-Second Butyrate with Urea Formaldehyde and Epoxy Resins*
F. M. Ball
Eastman Chemical Products, Inc.

14. *New Approach to Light-Stabile Epoxy Ester Varnishes*
D. R. Beasley
Union Carbide Chemical Co.

Thursday, June 4 . . . . . 8:30 A.M.

15. *Polycarbonates—A New Resin System*
D. W. Caird . . . . . General Electric Co.

16. *Design of Latexes for the Paint Industry*
E. J. Walsh . . . . The Dow Chemical Co.

17. *Fundamentals of Vinyl Latex Coating Formulating for Growing Trade Sales and Industrial Markets*
C. O. Schwahn
Union Carbide Plastics Co.

Courses Announced By University of Missouri

The following paint and polymer short courses for manufacturers and users have been announced by the University of Missouri, School of Mines and Metallurgy:

June 8-12. *Maintenance Coatings Short Course*
—for painting contractors, architects, maintenance engineers.

July 6-17. *Paint Short Course for Beginners*
—for anyone who is interested in the paint, varnish, raw materials, and allied industries.

July 20-21. *Advanced Paint and Polymer Refresher Course*
—for persons who desire up-to-date theoretical and practical education in the fields of coatings and polymers and who have had some previous training.

Complete information and registration blanks may be obtained be writing: Dr. Wouter Bosch, Dept. PVP, Missouri School of Mines, Rolla, Mo.

•

New Corporation Formed

Arthur S. Nicholas and Robert Cox, both professional engineers, have formed a new corporation, The Leon Chemical Industries, Inc., Warren, Mich.

The main products of the corporation are acrylic coatings for glass and metals, paint intermediates, and formulated epoxy.

DEVELOPMENT FACILITIES: Air Reduction Chemical Co., a division of Air Reduction Co., Inc., recently opened a new chemical laboratory and engineering office building in the Bound Brook, N. J. area. The new $400,000 installation is an expansion of the company's existing development facilities at Bound Brook. The new building will be the center for the development of chemical processes and products and for research on product applications.

NEWS

James Fryman Gives New York Club Talk

James C. Fryman of the Union Carbide Plastics Co. was the featured speaker at the New York Paint & Varnish Production Club's April meeting.

The subject of Mr. Fryman's talk was *Vinyl Dispersions for Product Finishes.*

James C. Fryman

In his talk, Mr. Fryman reviewed plastisols and organisols as they are used for product finishes of various types. He discussed the bright future for these products and their economy as compared with conventional coating systems.

After a general discussion of various basic formulating procedures, by which plastisol and organisol coatings may be produced, Mr. Fryman listed many end uses for these coatings, among which were finishes for desks, chairs, filing cabinets, clothing racks, movie screens, automobile dashboards and roofs, air conditioning and exhaust systems, motor coils, electronic equipment and outdoor furniture. He then discussed some unique applications such as vinyl wrinkle finishes and polyvinyl acetate emulsion hammertone finishes.

The talk was augmented by a series of slides demonstrating the theory behind organisols and plastisols, their action during cure, typical formulations and examples of many applications.

•

Technical Survey Tour

Headed by Henry H. Reichhold, president of Reichhold Chemicals, Inc., a team of eight executives of RCI recently departed for a technical survey of the chemical industry in Europe.

During the month-long economic tour of Great Britain and the Continent the group will exchange information and establish new contracts with their counterparts in the countries whose business activities reflect the establishment of the European common market.

Emphasizing that he was not traveling abroad solely to further the spread of American techniques, Mr. Reichhold said it was quite likely he would procure the rights to European production methods for use in the United States.

RCI plants have been established within the European common market countries for some time.

•

AZI Exterior House Paint Research Program

The first industry-wide research program designed to investigate all types of conventional exterior house paints is now underway across the nation, reports Schrade F. Radtke, research director for American Zinc Institute's expanded research program. Under the direction of the Institute's zinc pigments committee, and with special emphasis on the role played by zinc oxide in exterior house paint formulations, the test went into full operation in mid-August of 1958.

Mr. Radtke said that thousands of panels are being used in the test representing the latest paint types, pigment formulations, and vehicle developments. The purpose of the tests is to determine paint reactions to sun, sea air, industrial and city smoke, and will indicate the best levels of zinc oxide for improved tint retention, durability, nonchalking action, and resistance to mildew. Mr. Radtke noted that the test includes sites representing a cross section of weather types across the nation.

According to Mr. Radtke, the new research project is the first fully coordinated and integrated test program of its kind in the paint industry. Members of the zinc pigments committee are representatives of the five leading and competitive suppliers of zinc oxide to the paint industry, he declared. These are American Zinc Oxide Co., The Eagle Picher Co., New Jersey Zinc Co., Sherwin-Williams Co., and St. Jos. Lead Co.

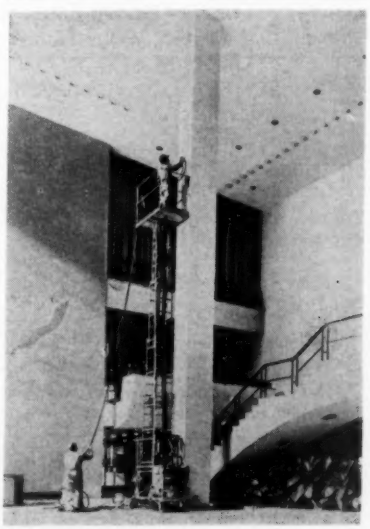
•

Witco Announces Merger

Witco Chemical Co., Inc. has announced the merger of Emulsol Chemical Corp., Chicago—a Witco subsidiary—with Witco's organic chemicals division.

A major purpose of the move is to widen distribution of Emulsol products through the use of the parent company's sales force. The Emulsol sales staff will be absorbed into the Witco organization. A. O. Raven, formerly Emulsol sales manager, has been appointed products manager of the Emulsol products line.

The merger will also result in a 50 per cent expansion of Emulsol research facilities. The Emulsol laboratories, formerly at 59 East Madison Avenue, Chicago, are now being consolidated with Witco's research and development laboratories at 6200 West 51st Street. Construction is now under way to accommodate the additional equipment and staff.



BAKELITE VINYL COATING: Combining durability with beauty, vinyl coatings were selected for the interior columns in the United Nations General Assembly Building because of high resistance to scuffing and finger marking, a considerable problem because of the U. N.'s 3000 daily visitors.

NEWS

Pacific Northwest Club Sets Annual Symposium

The annual symposium of the Pacific Northwest Paint and Varnish Production Club will be held May 22nd and May 23rd at the Multnomah Hotel in Portland, Oregon.

The following technical papers will be presented:

(1) "Natural Thixotropy" by Robert L. Balfour and Raymond Lubine of the T. F. Washburn Co.

(2) "Metal Flake Pigments" by Dr. Alexander F. Knoll of the Metal Disintegrating Co.

(3) "The Roll of Reactive Pigments in Paint" by W. E. Pepper of the New Jersey Zinc Co.

(4) "Epoxy Products in Coatings and Otherwise" by K. C. Johnson of the Ciba Products Corp.

(5) "Lets Look at Linseed Oil"—Panel Discussion

Moderator—C. E. Morris, director of research and development of the National Flaxseed Processors Association.

Panel—J. V. Porter, Archer Daniels Midland Co.
D. K. Farstad, Spencer Kellogg Co.
J. Stanton, Cargill, Inc.

Dr. J. S. Long, executive director of the Paint Research Institute will be the guest speaker at the Saturday luncheon.

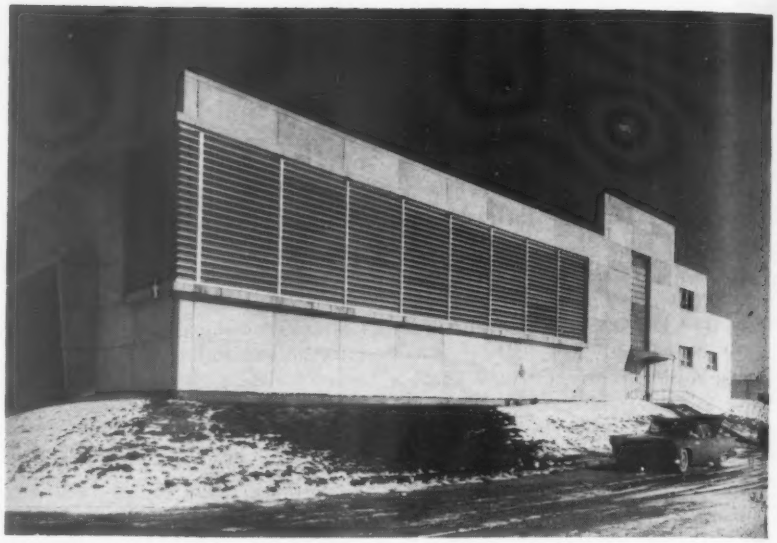
•

New Container Plant

Gordon D. Zuck, president, has announced the full operation of Southwestern Steel Container Co. for the production of steel pails and drums.

This new plant manufactures all popular sizes, gauges and types of pails, one to seven gallon capacity, with complete facilities for furnishing a full range of hi-bake linings, and all popular pouring openings, with containers colorfully lithographed.

The plant was built and equipped solely for the manufacture of steel shipping containers for paint, chemical, food and petroleum products. Complete warehouse stocks at the plant and in other principle cities throughout the Southwest are maintained of all trade sizes. A production line for 15 to 55 gallon drums is planned for installation in the very near future.



BUTYRATE COATING: After 18 months of exposure in a humid, saltwater atmosphere, the butyrate lacquer coated aluminum louvers of the ventilation building at Hampton Roads Bridge-Tunnel, Chesapeake Bay, have the same appearance as the day they were installed, with no evidence of oxidation residues or discoloration. The manufacturer was Construction Specialties, Inc., the butyrate lacquer was furnished by the Egyptian Lacquer Co., and the butyrate film former was supplied by the Eastman Chemical Co.

•

Coast Plants Purchased

D. A. Coape-Arnold, executive vice president of E. F. Drew & Co., Inc. of New York, has announced that the company has purchased the Malaga Oil Products Co. of Lindsay, Calif. and the Strathmore Oil and Fat Co. of Strathmore, Calif.

Strathmore now becomes a wholly owned subsidiary of E. F. Drew & Co. and will operate as the Strathmore Vegetable Oil Company, Inc.

Malaga becomes the Malaga Oil Products Division of E. F. Drew & Co. under the new arrangement.

•

H. E. Martin Passes

Harry E. Martin, sales manager for Fein's Tin Can Co., recently died at the age of 57.

Mr. Martin joined the firm in 1929 as a salesman and was appointed sales manager in 1949.

N. Y. Spring Clean-Up

The New York Paint, Varnish and Lacquer Association has been setting wheels in motion to culminate in a big Spring campaign from May 4-18.

The New York Clean-up, Paint-up, Fix-up Committee is under the chairmanship of Benjamin Farber of Farnow, Inc.

•

Miller Made Director Of N. Y. Board of Trade

Leon W. Miller, director of chemical sales for the Plastics & Coal Chemicals Division, Allied Chemical Corp., has been elected to the Board of Directors of the New York Board of Trade.

L. W. Miller

Mr. Miller spent two years on the executive committee of the Drug, Chemical & Allied Trade Section (one of the seven sections of the Board of Trade). He is now chairman of the membership committee of DCAT.

A resident of South Orange, N. J., Mr. Miller has spent his entire business life of 43 years with his present firm.

He is a member of the Chemists Club and the ACS.

NEWS

Lead Assn. & Zinc Inst. Hold Annual Meetings

A complete progress report of the greatly expanded, internationally sponsored research program on lead, started last year, was a feature at the 31st Annual Meeting of the Lead Industries Association held at the Drake Hotel, Chicago, on April 22-23, 1959.

Other parts of the program included a report of the market development activities of the Association and reports of the current status and future outlook for certain important lead products, including radiation shielding, tetraethyl lead anti-knock compound, storage batteries and pigments.

The zinc industry announced details of its recently initiated international research program, and discussed marketing problems and plans at the 41st Annual Meeting of American Zinc Institute, Inc., held on April 23 and 24 at Chicago's Drake Hotel.

Major representatives of the zinc industry discussed current marketing problems arising from consumption-production trends. Speakers described recently increased zinc marketing and research efforts aimed at consolidating and expanding present markets as well as the creation of new ones in the face of intensive competition.

Features included details of the new expanded research program sponsored jointly by American Zinc Institute and Lead Industries Association, underway as of September, 1958, as well as use of various marketing techniques for promoting and selling zinc.

•

Solvent Sales Discontinued

Union Carbide Olefins Co., division of Union Carbide Corp., is discontinuing the sale of solvent recovery plants, but will continue selling Columbia activated carbon for recovery purposes.

Effective immediately, Columbia activated carbon solvent recovery plants, previously designed and supplied by Union Carbide, will be manufactured and sold by Vulcan-Cincinnati, Inc., engineers and constructors, of Cincinnati, Ohio.

An important reason for Union Carbide's withdrawal from sale of solvent recovery plants lies in the fact that Union Carbide does not manufacture the equipment. Union Carbide plans to provide technical service for Columbia solvent recovery equipment installed up to the present time.

•

C. C. McInnes Dies

Clyde C. McInnes, 54, died recently after a prolonged illness.

Mr. McInnes had been manager of the solvent extraction division of American Mineral Spirits Co. He had been associated with this company for 30 years and was widely known in the vegetable oil extraction and protective coating industries.

•

Technical Committee Meets

Three sub-committee reports were featured at a recent meeting of the New York Paint & Varnish Club's technical committee.

Sub-Committee 53 — *Study of Pigment Dispersion.*

Sub-Committee 72—*Anomolous Gloss Phenomena in Fresh Paint Films.*

Sub-Committee 40 — *Hiding Power of Colored Pigments.*

Dow Product Program

Plans to speed the development of chemical products from the research laboratory to market have been announced by The Dow Chemical Co.

D. K. Ballman, director of sales, said that increased emphasis will be placed on discovering applications for new products and new uses for established ones, as well as defining needs and trends in the chemical and other industries for the guidance of Dow research projects.

In announcing the program, Mr. Ballman said that technical service and development (T.S.&D.) became part of the chemicals department, effective March 16, and will spearhead the accelerated development work.

•

"Hidden Power" Ready

Availability of the first section of *Hidden Power*, the long awaited new sales training bible of the paint industry, has been announced by the National Paint, Varnish and Lacquer Association.

The section is devoted to Trade Sales and is entitled *Sales Training Program For Dealers and Dealers' Clerks.* Its seven chapters and four appendixes, all illustrated in both color and black and white, have been published in loose leaf form to permit inclusion of future related material.

BULK STATION: Bulk facilities in Los Angeles for vinyl acetate polymers and copolymers have recently been established by the Dewey and Almy Chemical Division, W. R. Grace & Co. The new bulk station is located at 4280 Bandini Road, Los Angeles.

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PERSONNEL CHANGES

CROWN CORK & SEAL

Seth R. Schneible, has been appointed manager of aerosol product sales, it has been announced.

S. R. Schneible

Working out of the home office in Philadelphia, Mr. Schneible will be responsible for the development and promotion of all aerosol containers and related fitments.

A graduate of the U. A. Merchant Marine Academy, he was a sales representative for the Reynolds Metals Co., and Penland Paper Converting Corp. before joining the firm in January, 1958.

UNION CARBIDE CHEMICALS

Edwin V. King, Jr. has been appointed to staff associate and **Theodore W. Heiskell, Jr.** has been added to the quality control laboratory, it has been announced.

Mr. King, formerly a group leader, received a B. S. E. degree in chemical engineering from the University of Michigan in 1937, and began work in the company's laboratories in the same year. In his new position, he will conduct technical surveys and collaborate on operations analysis projects.

Mr. Heiskell received a B. S. degree in chemistry from West Virginia University in 1954 and an M. B. A. degree in industrial management from the University of Texas in 1958.

NATIONAL LEAD

George B. Coale and Graham W. Corddry have been elected directors, succeeding **George L. Ratcliffe** and **Leonard T. Beale,** it has been announced.

Mr. Coale is a vice-president of the firm and general manager of the Baroid division. He joined the company in 1935 as an engineer in the Titanium division and in 1948 was named chief engineer of the company. In 1949 he was appointed an assistant general manager of the Baroid division, and in 1954 became general manager. Mr. Coale was elected a vice-president in 1957. He is a graduate of the U. S. Naval Academy.

Mr. Corddry is manager of the Titanium division. He joined the company in 1932 as a member of the sales staff of the Titanium division, becoming eastern sales manager in 1936 and general sales manager in 1940. Mr. Corddry was named assistant manager of the division in 1947 and manager in 1957. He is a graduate of St. John's College at Annapolis, Maryland.

HEYDEN NEWPORT

Edward H. Herrick has been appointed manager of the Garfield, N. J. plant, it has been announced.

Mr. Herrick began his association with the corporation in 1940, and has been engaged since then in various supervisory capacities for both pilot plant and full-scale production operations at the Garfield plant. Prior to his present appointment, Mr. Herrick was area superintendent for formaldehyde and pentaerythritol production.

He received a B. S. degree in chemistry from Rutgers University in 1937.

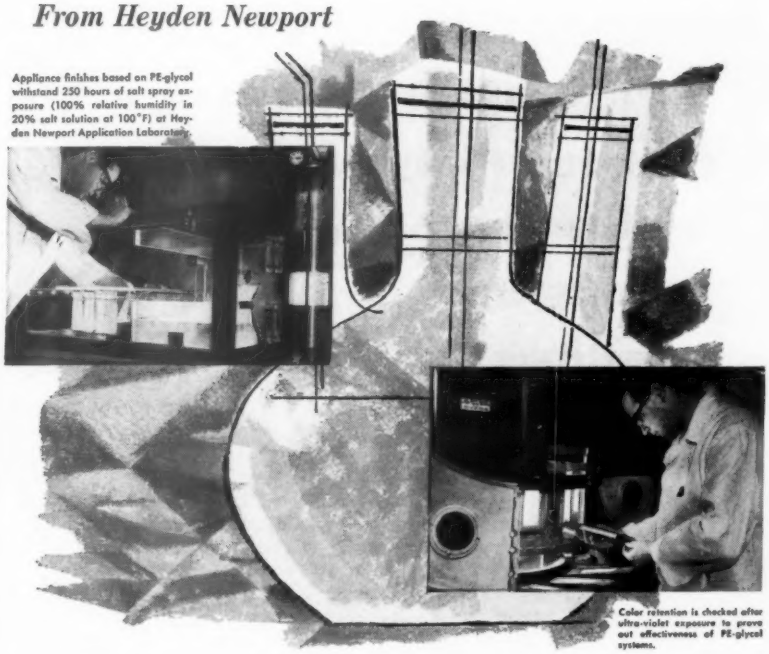
GENERAL ELECTRIC

The following personnel changes in the chemical materials department have been announced:

E. M. Irish, Jr., has been appointed product manager for the phenolics line, and **A. J. Bzdula,** former Detroit sales representative, has been named field sales manager for the chemical materials department, succeeding Mr. Irish.

W. F. Christopher has been appointed polycarbonate market development manager. **Richard J. Thompson** and **John B. Lidstone** have been assigned to sales development positions for polycarbonate resins.

From Heyden Newport



Appliance finishes based on PE-glycol withstand 250 hours of salt spray exposure (100% relative humidity in 20% salt solution at 100°F) at Heyden Newport Application Laboratory.

Color retention is checked after ultra-violet exposure to prove out effectiveness of PE-glycol systems.

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NEW HORIZONS. Pentaerythritol and its esters are finding increasing use in intumescent coating, plastic stabilizer, and plasticizer applications. Certain pentaerythritol derivatives are now showing considerable promise as lubricants and functional fluids.

1959

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DEWEY & ALMY

William A. Morton has been named assistant research manager in the organic chemicals research laboratory, it has been announced.

W. A. Morton

Mr. Morton fills a newly-created position. He will be in charge of research administration in the areas of existing product and new product research, development, and technical service. He was formerly Midwest sales manager for the organic chemicals division.

Mr. Morton joined the firm in 1954 after serving with the J. T. Baker Chemical Co. He received a B.S. in chemical engineering in 1950 from New York University, and did graduate work in industrial engineering at Ohio University.

SHELL DEVELOPMENT

Dr. C. W. Smith has been appointed head of the organic chemistry department, it has been announced.

Dr. Smith replaces **F. M. McMillan** who is now manager of research and development in the plastics and resins division.

At the same time, **Dr. P. H. Deming** or Orinda was appointed assistant department head in the department.

Dr. Smith was assistant department head in the plastics and resins department at the time of his appointment. He joined the company in 1943 after receiving his Ph.D. degree from the University of Iillinois. He was promoted to research supervisor in 1952 and to assistant department head of plastics and resins three years later. During 1953 to 1955, Dr. Smith was technical assistant to the president of the company in New York.

Dr. Deming received his Ph.D. degree from the University of Wisconsin in 1943 and joined the firm that year in San Francisco. He held positions with the chemical corporation before coming to Emeryville Research Center in 1949 as administrative assistant to the vice president—research, the position he held at the time of this appointment.

METASAP CHEMICAL

Robert E. Lally has been promoted to the position of manager of the firm's laboratories, it has been announced.

In his new position, Mr. Lally will be responsible for the direction of all laboratory activities in research, development, and technical service concerned with metallic soap and vinyl stabilizer applications.

Mr. Lally was graduated from Case Institute of Technology, where he received a B.S. degree in chemical engineering. He joined the company last July after 16 years in the chemical field with Ferro Chemical Corp. and Chas. Pfizer and Co.

ARCHER-DANIELS-MIDLAND

Arthur W. McKee has joined the New York sales office as a sales representative for commodity oils, it has been announced.

Mr. McKee formerly was a research assistant at the University of New Hampshire from which he holds a bachelor's degree.

MARBON

Earl W. Scott has become coordinator, latex and coatings development, it has been announced.

E. W. Scott

Mr. Scott will headquarter in the recently completed research and development facilities located at Washington, W. Va.

Mr. Scott brings to the new position a background of more than 15 years in the polymer and coatings field. He was formerly manager of new product development for the coating department of the chemical division, Goodyear Tire & Rubber Company.

His experience includes practical plant and development work with the use of latex and solution coating resins, and work with all phases in developing new products designed for specific end applications. He is a graduate of the University of Wisconsin.

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CARGILL

Emmett V. Kenefick has been named technical coordinator for linseed and soybean oils for the vegetable oil division, it has been announced.

E. V. Kenefick

Mr. Kenefick will be in charge of product specifications, manufacturing processes, shipment control, and special sales development work.

Mr. Kenefick, who joined the firm in 1957, was formerly research assistant with the Atomic Energy Commission.

He holds a masters degree in chemical engineering from Iowa State college, Ames, and bachelors degrees from St. Thomas college, St. Paul, and the University of Notre Dame, South Bend, Ind.

GOODYEAR

Organization changes in the chemical division have been announced.

Involved in the new alignment are **John Platner, R. S. Savage,** and **W. F. Overberger.**

Mr. Platner joins the rubber and rubber chemicals department as a senior sales engineer. In his new post, he will be responsible for sales liaison of rubber chemicals. He also will be in charge of technical sales service for these materials.

Mr. Savage has been assigned as senior sales engineer in the coatings department where his responsibilities will include sales service work pertaining to sales of latices to the paint, paper and textile industries.

Mr. Overberger has been transferred to the chemical division's development department. In this post, he will be responsible for liaison on technical developments involving Plioflex synthetic rubbers produced at the firm's Houston, Texas plant.

BARRETT

John C. MacLeod has been named to the newly created post of assistant to the president in charge of operations with headquarters in New York, it has been announced.

Mr. MacLeod, who in his new post will be in charge of manufacturing, engineering, purchasing and related functions, was formerly assistant director of operations for the solvay process division. He has been with the firm since 1925.

A graduate of Queens University, Kingston, Ont., Mr. MacLeod holds a degree in chemical engineering.

LUKENS LABORATORY

Reginald P. Perry has been named vice president, it has been announced.

R. P. Perry

Mr. Perry was associated with UBS Chemical Corp. for the past seventeen years during which time he served as Chief chemist, market research director, sales manager, general sales manager, director of marketing for both domestic and export sales, and as a member of the executive committee.

He has been closely associated with, and had wide experience in the polymer field in floor wax, rubber, leather finishes, adhesives and coatings, as well as the paper, paint and pigment industries. Mr. Perry will coordinate and direct the consulting services, research and development activities.

Mr. Perry holds a BS in Chemistry from Tufts Class of 1940.

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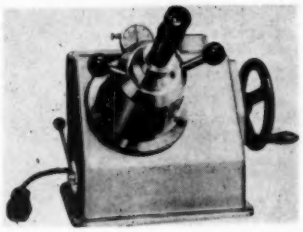

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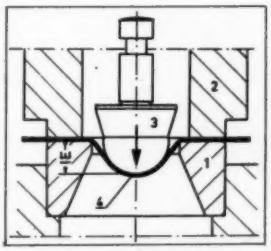

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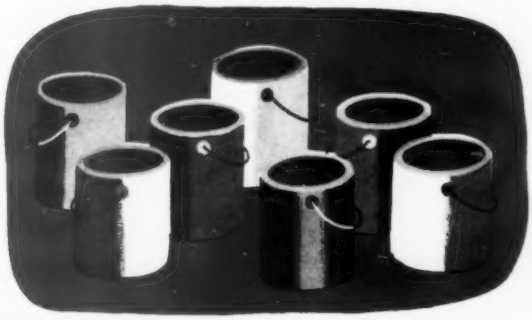

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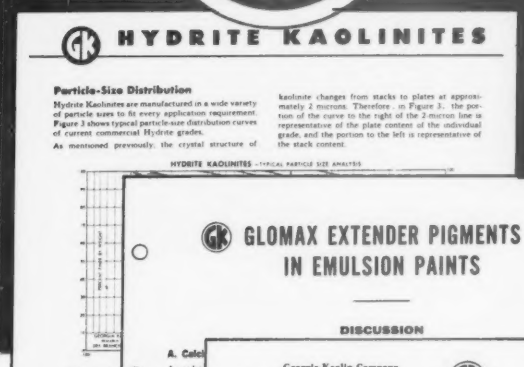
is more than just an "inside job"



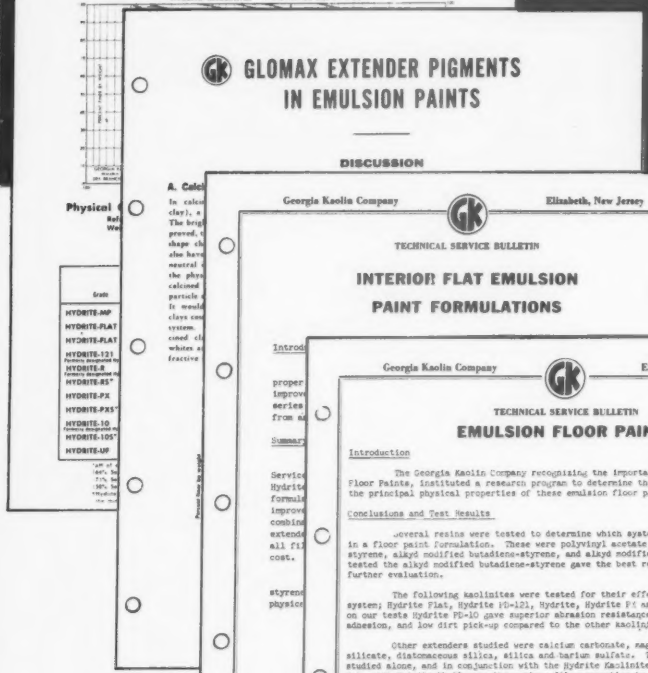
HYDRITE KAOLINITES

Particle-Size Distribution

Hydrite Kaolinites are manufactured in a wide variety of particle sizes to fit every application requirement. Figure 3 shows typical particle-size distribution curves of current commercial Hydrite grades.

As mentioned previously, the crystal structure of kaolinite changes from stacks to plates at approximately 2 microns. Therefore, in Figure 3, the portion of the curve to the right of the 2-micron line is representative of the plate content of the individual grade, and the portion to the left is representative of the stack content.

HYDRITE KAOLINITES - TYPICAL PARTICLE SIZE ANALYSIS



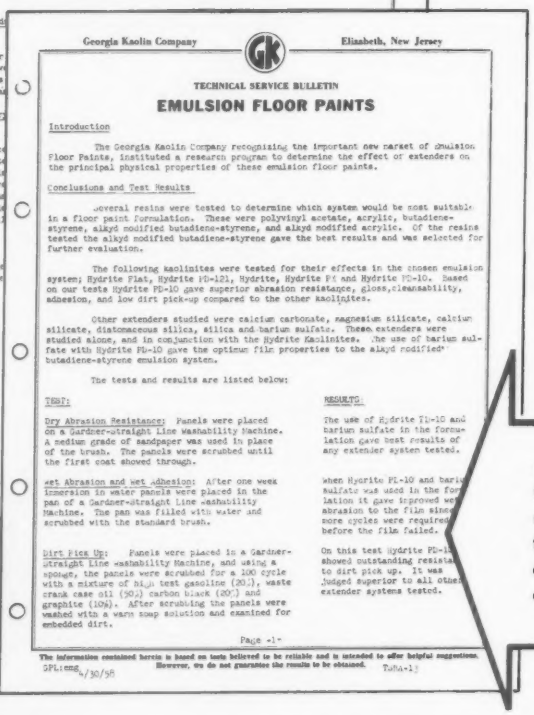
GLOMAX EXTENDER PIGMENTS IN EMULSION PAINTS

DISCUSSION

Georgia Kaolin Company — Elizabeth, New Jersey

TECHNICAL SERVICE BULLETIN

INTERIOR FLAT EMULSION PAINT FORMULATIONS



Georgia Kaolin Company — Elizabeth, New Jersey

TECHNICAL SERVICE BULLETIN

EMULSION FLOOR PAINTS

Introduction

The Georgia Kaolin Company recognizing the important new market of Emulsion Floor Paints, instituted a research program to determine the effect of extenders on the principal physical properties of these emulsion floor paints.

Conclusions and Test Results

Several resins were tested to determine which system would be most suitable in a floor paint formulation. These were polyvinyl acetate, acrylic, butadiene-styrene, alkyd modified butadiene-styrene, and alkyd modified acrylic. Of the resins tested the alkyd modified butadiene-styrene gave the best results and was selected for further evaluation.

The following kaolinites were tested for their effects in the chosen emulsion system; Hydrite Flat, Hydrite FU-121, Hydrite, Hydrite PX and Hydrite FU-10. Based on our tests Hydrite FU-10 gave superior abrasion resistance, gloss, cleansability, adhesion, and low dirt pick-up compared to the other kaolinites.

Other extenders studied were calcium carbonate, magnesium silicate, calcium silicate, diatomaceous silica, silica and barium sulfate. These extenders were studied alone, and in conjunction with the Hydrite Kaolinites. The use of barium sulfate with Hydrite FU-10 gave the optimum film properties to the alkyd modified butadiene-styrene emulsion system.

The tests and results are listed below:

TEST:	RESULTS:
Dry Abrasion Resistance: Panels were placed on a Gardner-straight line washability Machine. A medium grade of sandpaper was used in place of the brush. The panels were scrubbed until the first coat showed through.	The use of Hydrite FU-10 and barium sulfate in the formulation gave best results of any extender system tested.
Wet Abrasion and Wet Adhesion: After one week immersion in water panels were placed in the pan of a Gardner-straight Line Washability Machine. The pan was filled with water and scrubbed with the standard brush.	When Hydrite FU-10 and barium sulfate was used in the formulation it gave improved wet abrasion to the film since more cycles were required before the film failed.
Dirt Pick Up: Panels were placed in a Gardner-straight Line Washability Machine, and using a sponge, the panels were scrubbed for a 100 cycle with a mixture of hi-b test gasoline (20%), waste crank case oil (50%) carbon black (20%) and graphite (10%). After scrubbing the panels were washed with a warm soap solution and examined for embedded dirt.	On this test Hydrite FU-10 showed outstanding resistance to dirt pick up. It was judged superior to all other extender systems tested.

Page -1-

The information contained herein is based on tests believed to be reliable and is intended to offer helpful suggestions. However, we do not guarantee the results to be obtained.

GPL:eng 4/30/58 Tuba-13

Samples are available on request.

When Georgia Kaolin studies the effects of its extender pigments in new paint systems and formulations, each test becomes a dual project. All extender application experiments are first made "inside" in the GK Research and Development Laboratories, then "outside" in an independent paint development laboratory.

These carefully evaluated "inside and outside" test results enable us to make recommendations for paint formulations, based on the known performance characteristics of our extender pigments. There are eleven types of Hydrite Kaolinites, and three types of Glomax calcined extenders available, which, when used alone or in various combinations, improve the quality and reduce the costs of emulsion paint systems.

● These four bulletins contain information regarding the influence of GK extender pigments in suggested starting formulations. Write direct, or to the GK distributor nearest you, for your free copies.

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